

RELATIONSHIP AMONG HOUSING QUALITY, FOOD INSECURITY, SOCIAL  
SERVICE NEEDS, DOMESTIC VIOLENCE, AND MENTAL HEALTH NEEDS OF  
CHILDREN AND FAMILIES

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## **ABSTRACT**

**KRISTINA TEN HAAGEN: Relationship among Housing Quality, Food Insecurity, Social Service Needs, Domestic Violence, and Mental Health Needs of Children and Families**  
(Under the direction of Rune J. Simeonsson)

This study examined the predictive quality of housing problems, food insecurity, social service needs and various demographic co-variates in determining the presence or absence of domestic violence problems and mental health needs. The study utilized secondary data for a group of participants including 308 female parent/guardians recruited over a 12-month period from the Children's Hospital Primary Care Center (CHPCC) at Children's Hospital Boston. Families attending the health center that completed the survey were primarily from low-income and predominantly Hispanic and African American. A series of logistic regression models found a marginally significant effect for the relationship between housing problems and domestic violence problems, and a significant effect for the relationship between social service need and domestic violence problems. No relationship was found between all predictor variables and reports of mental health need. Implications for research and practice are considered.

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## **CHAPTER 1**

### **LITERATURE REVIEW**

#### Introduction

Much research has examined the impact of sociological stress on physical and mental health. When such stress is measured comprehensively, including negative life events, chronic strains, and/or traumas, their effect on health can be significant and substantial. Research has demonstrated that major life events often require individuals to make changes in their daily lives over a short period of time which can impact people's ability to cope or adapt, which in turn may leave them more vulnerable to infection, injury or disease. In addition to sudden and overwhelming changes, people of color can be additionally harmed by discriminatory stress. Major research findings indicate that stressors proliferate over the life course and across generations, which ultimately contribute to widening health gaps between higher socioeconomic status and lower socioeconomic status groups (Thoits, 2010). For example, in a cross-sectional study examining the relationship between social stressors and depressive symptoms in 119 pregnant African American women, findings indicated that both discrimination and social conflict together accounted for a large portion of the variance in depressive symptoms (Dailey & Humphreys, 2010).

Although there is an abundance of research examining the effects of stress and/or race/ethnicity on mental health, it is unclear what factors best predict stressors and mental health concerns among individuals, including those of lower and higher socioeconomic status. A review of further research is needed in this area to better target interventions for

those individuals who may be at greater risk for stressors, and therefore at greater risk for poor mental and physical health. Current literature suggest a variety of potential factors that are associated with socioeconomic status and mental and physical health (Suglia, Duarte, & Sandel, 2011; Benson & Fox, 2004;Zabkiewicz, 2010; Williams & Sternthal, 2010;Hogan & Park, 2000).

### Models of Inequalities: Understanding the Link Between Socioeconomic Status (SES) and Health

From an ecological perspective, it is the interaction between social and physical environments and development that account for the developmental link between early life adversities and adult outcomes (Bronfenbrenner, 2005; Shonkoff & Garner, 2012). When examining the impact of low socioeconomic status on mental health from this perspective, the role of ecology can be viewed as a significant contributor to stress. As a risk factor for negative psychological responses, it may lay the groundwork for more chronic mental health problems later in life (Shonkoff & Garner, 2012).

Previous research examining early development and human needs from an ecological perspective date back to famous psychologists of the 20<sup>th</sup> century, such as Abraham Maslow. Maslow believed that an individual is an integrated whole, and therefore theories of psychology associated with motivation and emotion should include the study of human needs and goals (Zalenski & Raspa, 2006). As a result, he formulated a pyramid model, Maslow's hierarchy of basic human needs, suggesting that higher needs depend on lower needs being met. At the bottom of the pyramid are basic biological needs, such as food, water, shelter, and sleep. Next are safety needs, including law, security, and stability, followed by love/belonging needs, such as family, affection, relationships, and work. The top two tiers of

the pyramid include esteem needs, including achievement, status, responsibility, and reputation, and self-actualization needs, such as awareness and meaning (Maslow, 1970).

This model provides an important basis in understanding the link between SES and health, such that basic needs, including food, water, and shelter, are required in order to achieve higher levels of self-actualization, including safety needs. For families living in poverty, meeting basic needs can be difficult to achieve, which impacts social development. It is the interaction between both physical and social needs that often result in increased stress, and therefore increased risk for mental health concerns.

The relationship between socioeconomic inequality and health can be examined through several lenses. For example, there are several proposed models for the relationship between lower socioeconomic status and mental health, including the persistence model, the cumulative effects model, the emergent model, and the childhood-limited model (Chen, Matthews, & Boyce, 2002; Nicholson, Lucas, Berthelsen, & Wake, 2010; Prus, 2007). The persistence model functions under the assumption that inequalities are established early in life and persist over time, while the cumulative effects model proposes that inequalities surface early in life and then increase over time due to varying amounts of exposure to adversity. The emergent model suggests that inequalities become prominent only at older ages, and the childhood-limited model proposes that early life inequalities decrease over time. Together, these models indicate that strategies to address adversities and childhood health concerns may differ depending on timing in life, suggesting that there may be an optimal time for intervention.

## Research Examining Socioeconomic Status and Health

Research findings indicate that in any given year, approximately 30% of the population worldwide is affected by some type of mental illness or disorder (Chisholm et al., 2007; Kessler et al., 2005b; Ngui, Khasakhala, Ndeti, & Roberts, 2010; Wittchen, Jonsson, & Olsen, 2005). In addition, research has demonstrated that two thirds of individuals affected do not receive appropriate care, and that these unmet needs are most significant for children and youth. Findings indicate that between 10% and 20% of all children are affected by one or more mental health concern (Kataoka, Zhang, & Wells, 2002; Ngui & Flores, 2007; Murthy et al., 2001; Ngui et al., 2010). Previous research has documented that unstable early environmental, such as family conflict or poverty, may sensitize individuals to the adverse effects of later stressors and increase risk for mental health concerns, such as depression and anxiety (Koenen, Moffit, Poulton, Martin, & Caspi, 2007; Li, Davidson, & Jurkowski, 2012).

Poverty has been defined by the American Heritage Dictionary (2011) as the "lack of means of providing material needs or comforts." In the United States, research indicates that over 20% of children under the age of 18 are considered poor and living in households with incomes that fall below the federal poverty line (FPL) (Aber & Chaudry, 2010; National Center for Children in Poverty, 2009; Yoshikawa, Aber, & Beardslee, 2012). In the United States, the FPL is utilized by the U.S. government to define who is poor. The level is based on a family's annual income, rather than wealth, annual consumption, or self-assessment of well-being. In 2013, the FPL guideline was set at an annual income of \$23,000 for a family of four ("Federal Poverty Level," n.d).

The FPL is also utilized to give subsidies to families who earn slightly more than the poverty level. For example, for families of four that are 150% of the FPL, the level would be

calculated at \$35,325 (i.e.  $1.5 \times \$23,550$ ). Many federal programs also utilize FPL guidelines as a basis for eligibility. For example, eligibility for programs such as Head Start, Food Stamps, the National School Lunch Program, the Low-Income Home Energy Assistance Program, and the Children's Health Insurance Program (CHIP) are based on FPL's ("Federal Poverty Level," n.d.).

In addition, research has demonstrated that poverty is a significant risk factor for various mental, emotional, and behavioral disorders of children and youth (National Research Council & Institute of Medicine, 2009; Yoshikawa et al., 2012). For example, previous research indicates that both within-individual childhood characteristics and early environmental conditions increase the risk of developing Post Traumatic Stress Disorder (PTSD). More specifically, findings suggest that low SES is a significant environmental risk factor associated with this disorder (Koenen et al., 2007). Similarly, research findings indicate that low-income mothers report higher levels of depressive symptoms due to financial stresses and frequent lifestyle changes (Li, Davison, Jurkowski, 2012). One study examined the relationship between housing status, depression, anxiety, and problem behaviors among children (80 homeless and 148 never homeless) living in Worcester, MA utilizing parent reports of behavior. Results of relational analysis demonstrated that housing status, including homelessness and financial burdens, is associated with internalizing problem behaviors, such as withdrawal and loss of interest (Buckner, Bassuk, Weinreb, & Brooks, 2009).

Socioeconomic status embodies a range of resources, including money, knowledge, prestige, power, and social connections (Phelan, Link, & Tehranifar, 2010). There is an abundance of research examining the association between socioeconomic status and mental

health. For example, being employed has been linked to lower levels of depression, higher levels of self-esteem and greater life satisfaction (Graetz, 1993; Thoits, 2010; Matthews & Power, 2002; Zabkiewicz, 2010). Some research suggests that several mental and physical health diseases that present in adulthood should be viewed as developmental disorders that surface early in life. This research proposes that persistent health disparities associated with poverty and higher levels of stress in childhood has negative effects on long term development (Shonkoff, Andrew, & Garner, 2011).

Across nations, the poor are almost universally at higher risk of developing mental health disorders than non-poor individuals. Research has indicated that there is an inverse relationship between socioeconomic status and mental health, where poverty is both an antecedent and a consequence of poor mental health (Dalgard, 2008; Murali & Oyeboode, 2004; Ngui et al., 2010). In other words, mental health disorders can increase the likelihood of individuals living in poverty, and poverty also increases the likelihood of developing mental health disorders (Bostick, 2004; Das, Do, Friedman, McKenzie, & Scott, 2007; Murali & Oyeboode, 2004; Ngui et al., 2010).

Similar research has documented that poor mental health and poverty interact within a negative cycle for persons living in low- and middle-income countries (Lund et al., 2011). This research proposes that poverty increases the risk of mental health disorders through the means of heightened stress, social exclusion, malnutrition, increased exposure to violence and trauma, and decreased social capital. In contrast, individuals who already present with mental health concerns have an increased risk of moving into or remaining in poverty due to increases in health expenditure, loss of employment, increased stigma, and overall reduced

productivity (Flisher, et al., 2007; Lund et al., 2011; Lund, Breen, Flisher et al., 2010; Patel & Kleinman, 2003; Saraceno, Levav, & Kohn, 2005).

Previous research has also demonstrated the cumulative effects of poverty on mental health. One study examined whether exposure to family poverty over a child's early life course could predict adolescent and young adult anxiety and depression (Najman et al., 2010; Najman; Bor, O'Callaghan, Williams, & Shuttlesworth, 2009; Poulton et al., 2002; Seguin et al., 2005). The study utilized a birth cohort from a sample of women living in Australia that were recruited early in pregnancy and whose children were followed up at 14 and 21 years of age. The study sample included 2609 mothers and adolescents who provided utilizable data. Through the use of regression models, findings confirmed the association between the number of episodes of poverty that a family experienced at multiple stages in a child's early development, and found consistent mental health impairments in adolescence and early adulthood (Najman et al., 2010). The authors suggest that poverty was the greatest predictor variable that affects a number of lifestyle characteristics (such as parental conflict, poor school performance, difficulty obtaining employment, etc.), which lead to increased rates of anxiety and depression in children and adolescents (Ben-Shlomo & Kuh, 2002; Kroenke, 2008; Najman et al., 2010; Seguin et al., 2005; Wood, 2003).

Important research has also demonstrated that alleviating poverty may affect mental health. One study examined the effects of a large-scale anti-poverty program in Mexico, called Oportunidades, on maternal depressive symptoms (Ozer, Fernald, Weber, Flynn, & VanderWeele, 2011). Results demonstrated a decrease in depressive symptoms in the treatment group receiving Oportunidades, compared to the control group. In addition, reductions in perceived stress and increases in perceived control were associated with the

effect of Oportunidades on women's mental health (Ozer et al., 2011). This research supports important factors, such as employment and economic stability that influence the relationship between poverty and mental health.

### Socioeconomic Status and Housing Quality

Housing quality is closely tied to low socioeconomic status and poverty. For example, limited financial resources often results in fewer housing options, including housing options that are likely to be in a state of internal and external disrepair. In addition, individuals with financial needs are likely to move more frequently, and may live in areas with limited access to services and other facilities (Suglia et al., 2011). Previous research indicates that financial burdens, including difficulty paying rent, paying for utilities and groceries, or paying for necessary health appointments, are all sources of psychological distress that are strongly associated with mental health (Lahelma, Laaksonen, Martikainen, Rahkonen, & Sarlio-Lateenkorva, 2006; Reading & Reynolds, 2001; Suglia et al., 2011).

### Housing Quality and Mental Health

In addition to the relationship between socioeconomic status and housing quality, poor housing conditions and housing instability have been associated with poor mental health, although research examining the relationship between these variables is limited (Burdette, Hill, & Hale, 2011; Suglia, et al., 2011). Housing is historically intertwined with health, as its primary purpose is to provide shelter for families. However, housing can represent much more than just shelter, as it also provides a sense of security, safety, privacy, and comfort at the psychological level. One's home is often viewed as an escape from the outside world, a place to recover from daily hardships and a source of personal identification (Burdette et al., 2011). In addition, housing can also be defined by its surrounding



neighborhood and social environment. In other words, housing can be viewed at multiple levels, including structural (i.e. internal and external stability), psychological (i.e. sense of security and/or comfort), and social (i.e. access to services and perceived social support), all of which can have a significant impact on health (Dunn, 2002; Shaw, 2004; Suglia et al., 2011). Given that housing and health are intertwined, a better understanding of the relationship between these variables and possible confounding variables is needed.

Poor housing quality is associated with physical and mental health stresses through both direct and indirect pathways (Suglia et al., 2011). As noted above, housing quality can be viewed from multiple angles. Structural aspects of the home include a wide variety of variables, including mold, pest infestation, peeling paint, and housing type (i.e. multiunit, higher or lower floor level, etc.). These types of structural housing features can have a direct impact on health, and have been associated with distress symptoms and depression among women (Evans, Wells, & Moch, 2003; Suglia et al., 2011). The link between structural components of the home and physical and mental health may be due to multiple factors, including difficulty dealing with home repairs, the stigma of living in an unclean or deteriorated home, fear of eviction, disagreements with landlords, and general insecurity (Evans et al., 2003; Suglia et al., 2011). In addition, individuals living in deteriorating or other poor housing conditions could experience feelings of embarrassment or shame. Once individuals begin to internalize stigma and negative perceptions, their housing conditions are likely to contribute to lower levels of self-esteem and subsequently impact their mental health (Burdette et al., 2011; Wells & Harris, 2007)

Housing quality can also indirectly impact health, such as housing location, accessibility to services and facilities, social connectedness to surrounding communities, and

possibly neighborhood-built environments, such as access to recreation and parks (Shaw, 2004; Suglia et al., 2011). Similarly, housing features not related to the structure of the home, such as overcrowding, housing costs, or lack of control over housing, have also been documented as associated with distress symptoms and poor mental health (Dunn, 2005; Dunn & Hayes, 1999; Evans, Lepore, & Allen, 2000; Suglia et al., 2011). This indirect impact on health is likely explained by issues of control, such that when an individual loses the ability to take control over their own environment, they are likely to experience difficulties coping with the situation and therefore perceive stress (Elliot, 2000; Suglia et al., 2011).

Periods of homelessness have also been associated with poor physical and mental health. Previous research has indicated that homelessness can be both an antecedent and a consequence of physical and mental health (Munoz, Crespo, & Perez-Santos, 2005; Suglia et al., 2011). For example, physical and mental health problems can impact an individual's ability to work, therefore interfering with economic resources (Phinney, Danziger, Pollack, & Seefeldt, 2007; Suglia et al., 2011). Poor mental and physical health can also isolate individuals and alter social relationships, therefore reducing social support and placing them at an increased risk for homelessness. In addition, housing instability, such as frequent moves or not having enough money to pay rent has been associated with psychological distress and depression among women (Burdette et al., 2011; Magdol, 2002; Davey-Rothwell, German, & Latkin, 2008; Suglia et al., 2011).

Although the literature has documented a relationship between poor housing conditions and psychological distress, research in this area is limited and several methodological limitations have been noted (Burdette et al., 2011). For example, previous research has relied heavily on participants who have been diagnosed with previous mental

health conditions, interchanged housing quality with neighborhood quality, utilized small community samples, or have not accounted for other social stressors that may co-occur for individuals suffering from poor housing conditions (Blackman & Harvey, 2001; Burdette et al., 2011; Evans & English, 2002; Evans, Wells, & Chan, 2000; Hopton & Hunt, 1996; Suglia et al., 2011; Wright & Kloos, 2007).

### Domestic Violence and Health

Closely tied to issues of housing problems and instability are issues of domestic violence and intimate partner violence. Although the prevalence of violence varies across research due to definitional differences in the populations studied, overall percentages of domestic violence in the United States are generally consistent. One study calculated a lifetime occurrence of 9% for severe violence and 22% for total violence. When the range of both minor and physical acts of physical violence towards women is included, the prevalence of domestic violence is approximately between 10% and 15% (Witt & Olson, 1996).

Research has demonstrated that partner violence is more prevalent in low-income urban environments, and is more likely to occur when families are facing financial strain and burdens (Benson & Fox, 2004; Benson & Fox, 2001; Suglia et al., 2011). As a result, individuals who are victims of partner violence who suffer from financial strain are also likely to experience difficulty obtaining and maintaining stable housing (Suglia et al., 2011).

One recent study examined women participating in a California-population based cohort using data from the 2003 California Women's Health survey, a probability survey of adult California women (n = 3619) (Pavao, Alvarez, Baumrind, Induni, & Kimerling 2007). Logistic regressions were utilized to predict housing instability in the past 12 months, adjusting for multiple covariates, including age, race/ethnicity and education. Results found

that victims of partner violence were four times more likely to report housing instability than individuals who were not experiencing partner violence. (Pavao et al., 2007; Suglia et al., 2011). In addition to housing instability, individuals experiencing partner violence are likely to have increased levels of mental health concerns. Together, these findings suggest the importance of including issues of domestic violence in research investigating the relationship between housing problems and mental health.

#### Single Parent versus Partnered Parents and Health

There is a large body of research examining socioeconomic status as it relates to employment and health. In general, the literature demonstrates that employment measured alone is associated with more positive health, including lower levels of depression and higher levels of life satisfaction and self-esteem (Aneshensel, Frerichs, & Clark, 1981; Zabkiewicz, 2010). However, findings in this area appear to be variable based on marital status. For example, research has indicated declines in distress among married mothers who gain employment, while single mothers receive no health benefit from employment (Ali & Avison, 1997; Zabkiewicz, 2010). Many researchers believe that this finding is associated with the fact that single mothers are more likely to be poor, therefore poverty and relationship status may operate together, such that single mothers experience additional stress from the combination of work and family roles, which in turn prevents them from benefiting from the effects of employment on health (Zabkiewicz, 2010; Cleary & Mechanic, 1983). In addition, single mothers may experience difficulty with irregular work schedules, extended work hours, or inconsistent employment that is likely to contribute to increased levels of distress (Bardasi & Francesconi, 2004; Marchand et al., 2003; Zabkiewicz, 2010).

Based on the research noted above, a recent study examined the mental health benefits of work and its impact on poor single mothers (Zabekiewicz, 2010). The study drew upon data from the Welfare Client Longitudinal Study, with a sample size of 955 mothers. Generalized estimating equations were utilized to assess the role of current employment and employment continuity on depression of poor single mothers. Findings suggested that employment does improve mental health, but that the circumstances of employment, such as whether the employment is full-time and/or stable, is likely to impact a person's overall health (Zabekiewicz, 2010). Results from this study demonstrate a need to consider partnered versus single parent families when determining predictors of stress in both lower and higher socioeconomic individuals.

#### Family Structure, Socioeconomic Status, and Health

In addition to research examining single versus partnered family households, research has also examined the effects of family composition on mental health. The resulting literature suggests that the structure of one's family influences the risk of depression (Barrett & Turner, 2005; Gilman, Kawachi, Fitzmaurice, & Buka, 2003). Findings indicate that mother-father families have the greatest protection against mental health problems in children, while the absence of both parents provides the least protection for children (Spruijt & de Goede, 1997). Research also demonstrates lower parenting quality by mothers and grandmothers in families in which three generations live together (Barrett & Turner, 2005).

Within studies that examine the relationship between mental health and family structure, results indicate that SES is a mediating factor. Given that childhood poverty is closely associated with mental health problems in adolescents and adulthood, the disparity in SES resources across family types is important. Research suggests that exposure to stress

may vary by family composition, including financial burdens resulting from limited income and potentially greater needs. For example, low-income families living with a larger number of children and/or family members have a greater need for resources that they are unable to access due to financial strains. Previous research findings suggest that exposure to such chronic environmental strains are predictive of depressive symptomology in both children and their care givers (Gore, Aseltine, & Colton, 1992). Similarly, poor family functioning has been linked to higher perceived stress and depressive symptoms in children and their caregivers (Li, Davidson, & Jurkowski, 2012; Sarmiento & Cardemil, 2009). Research has demonstrated similar findings related to adverse health consequences, such that single mothers of large families have less time for physical activity and general self-care, which increases their risk for negative health outcomes, such as obesity and cardiovascular diseases (Li, Davidson, & Jurkowski, 2012; Proper, Singh, van Mechelen, & Chinapaw, 2011; Vanhecke et al., 2009).

#### Education, Socioeconomic Status, and Health

Previous research has linked education and socioeconomic status to mental and physical health outcomes. For example, research findings indicate that more highly educated parents with better financial situations are more likely to seek out and receive prenatal care for their children, have fewer health complications, and are more likely to seek out and receive early diagnoses and treatment of potential impairments for their children (Hogan & Park, 2000; House & Kahn, 1985). Meanwhile, lower levels of education have been linked to greater risk of poverty, which in turn is often linked to limited access to necessary medical care (Hogan & Park, 2000; Kogan et al., 1995; Newacheck & Stoddard, 1994). Such findings

demonstrate that education may be a factor associated with both low socioeconomic status and health.

When thinking about the relationship between poverty, education, and health, the concept of intergenerational poverty also comes into play. The definition of poverty is often associated with one person; however, intergenerational poverty is the state of generations of a family being impoverished ("Intergenerational Poverty in America," 2011). The concept of intergenerational poverty primarily stems from education and economics, where being well-educated lowers an individual's chances of being in poverty (Lankford, Loeb, & Wyckoff, 2002). Previous research has proposed that a parent who is a victim of negative circumstances, unable to attain a quality education, and thus unable to find a well-paying job, is likely to wind up in poverty. The children of these individuals, still living in that same area, also suffer from not having a quality education; therefore the results are the same, more poverty (Wagmiller & Adelman, 2009). The belief is that the children of these families will likely be impoverished since social and economic deprivation during childhood and adolescents can have long lasting effects on development. This makes it difficult for children of low-income families to escape poverty when they grow older. This chain of events is considered a cycle of intergenerational poverty ("Intergenerational Poverty in America," 2011).

#### Issues of Race/Ethnicity, Socioeconomic Status, and Health

Much research has examined racial and ethnic inequalities in health in the United States, although the theories and findings that support this research vary. For example, in the late nineteenth and early twentieth centuries, medical paradigms attributed racial differences in health as the result of innate biological differences between groups (Krieger, 1987;

Williams & Sternthal, 2010). Others saw racial inequalities in health resulting from differences in social advancements and/or the different conditions in which person's lived, including poor genetic predispositions, possible neglect, poor food and housing, and unsanitary living conditions (Williams & Sternthal, 2010). In addition to research investigating the persistence of racial differences in health, gender has also been noted as a contributing factor to racial differences in gaps in health. For example, findings indicate that the racial gap in health tends to be larger for men than for women, potentially due to differences in housing conditions and access to work/employment based on gender and race (Du Bois, 1967; Williams & Sternthal, 2010).

Differences in health associated with race/ethnicity and gender have been documented by sociologists often as the product of segregation. Research has demonstrated that segregation can mediate the effects of poverty, social disorder, and social isolation, as well as creating poor living conditions in residential environments (Masset, 2004; Schulz, Williams, Israel, & Lempert, 2002; Williams & Sternthal; Williams & Collins, 2001). In addition, findings indicate that segregation is likely to have greater impact on health for African Americans than other groups, due to the higher levels of segregation among this group compared to other immigrant groups in U.S. history (Massey & Denton, 1993; Williams & Sternthal, 2010).

Experiences of discrimination have also been shown to be a source of stress that has an adverse effect on health. Research has demonstrated increased levels of exposure to discrimination for socially stigmatized racial and immigrant groups, and that this discrimination can be associated with increased risk for physical and mental illness. In addition, discrimination has been shown to adversely affect patterns of health care utilization,



poor adherence behaviors, and increased risk for use of substance and one's ability to cope with stress (Williams & Sternthal, 2010; Williams & Mohammed, 2008).

Several studies have incorporated race/ethnicity and/or gender into their analysis of socioeconomic status and health, although findings are mixed. For example, Slopen, Fitzmaurice, Williams, & Gilman (2010) noted that food insecurity, as poverty, has been demonstrated to be patterned by race/ethnicity, likely associated with segregation and discrimination as discussed above. In one recent study, socioeconomic predictors of health and development in middle childhood were examined based on variations of socioeconomic status and race (Nuru-Jeter, Sarsour, Jutte, & Boyce, 2010). A total of 60 Families were recruited who had a child between 8 and 12 years of age from the San Francisco Bay area over the course of a year. MacArthur Health and Behavior Questionnaires were utilized to assess health and adaptive functioning across developmental domains. A series of multivariate least squares regression analyses were conducted with the data for the total sample and between racial groups (Nuru-Jeter et al., 2010).

Findings from this study demonstrated that compared to White children, Black children had worse global physical health, exhibited greater externalizing and Attention Deficit Hyperactivity Disorder (ADHD) symptoms, experienced more bullying, and had lower academic competence. In addition, health was more strongly associated with educational attainment among Whites, and more strongly associated with financial resources for Blacks, indicating that differences in race/ethnicity are impacted by socioeconomic status and other confounding variables (Nuru-Jeter et al., 2010). Hypothesized explanations for these differences include the fact that economic hardships are an added burden exacerbating the distress experienced by Black families. In addition, previous research indicates that

compared to Whites, Blacks often experience multiple hardships over longer periods of time (George & Lynch, 2003; Nuru-Jeter et al., 2010). Others have hypothesized that economic disadvantages experienced by Black families increase psychological distress, which is in turn associated with poor parenting behavior, and therefore greater perceived stress, lowered sense of self-worth, and depression (McLoyd, 1990; Nuru-Jeter et al., 2010).

Given the patterns of social inequalities related to race/ethnicity and gender described above, it is clear that there is a relationship between socioeconomic status, race/ethnicity and health. Although research findings are mixed with regard to the role race/ethnicity plays in relationship to health, socioeconomic status and other confounding factors, it is a variable that warrants further investigation as a risk factor for health. In addition, further research that examines race/ethnicities other than just Black and/or White and their relationship to health is needed.

#### Socioeconomic Status, Food Insecurity, and Health

Food insecurity is defined as limited or uncertain availability of food due to inadequate resources (Nord, Andrews, & Carlson, 2007; Slopen et al., 2010). In addition, food security can refer to the ready availability of nutritionally adequate and safe foods in order to live a healthy and active life (Kropf, Holben, Holcomb, & Anderson, 2007). Poverty and food insecurity are closely intertwined, and can have an adverse impact on health. As previously discussed, research has demonstrated that chronic poverty is associated with an elevated risk of psychopathology, including internalizing, externalizing, social, and attentional problems (Boret al., 1997; Slopen et al., 2010). Although research examining the relationship between poverty, health, and food insecurity is limited, there are cross-sectional studies that suggest an independent link between food insecurity and higher levels of child

behavioral/emotional problems (Alaimo, Olson, & Frongillo, 2002; Slopen et al., 2010; Whitaker, Phillips, & Orzil, 2006). In addition, physical health concerns have been documented, such as increased risks of iron and vitamin deficiencies (Slopen et al., 2010; Whitaker et al., 2006).

A recent study examined the associations of poverty and food insecurity, and the behavior for childhood internalizing and externalizing disorders over a 2-year period (Slopen et al., 2010). A sample of 2,810 children was interviewed between the ages of 4 and 14 years at baseline and between 5 and 16 years of age at follow up. Primary caregivers reported on income, food insecurity, and behavior, using the Child Behavior Checklist. Regression analyses were utilized to determine the relationship between internalizing and externalizing behaviors and patterns of poverty and food insecurity. Findings indicated that at baseline, both internalizing and externalizing problems were more prevalent among children living in poor households than for children living in non-poor households. In addition, internalizing and externalizing problems were more prevalent among children living in food insecure households than children living in food-secure households (Slopen et al., 2010). These results demonstrate the potential importance of food security as a factor in determining the etiology of child mental and physical health.

A large body of research has also examined food insecurity and socioeconomic status through the study of individual's participation in the Women Infant and Children (WIC) program. WIC programs are designed to address the nutritional problems faced by low-income women and their children (Birkett, Johnson, Thompson, & Oberg, 2004; Kropft et al., 2007). Given that low socioeconomic status has been linked to poor diet quality

and increased rates of obesity, WIC programs aim to provide additional support to these populations (Langevin et al., 2007). More specifically, WIC provides supplemental food supplies, nutrition education, and assistance in obtaining health and welfare services for low-income women and children younger than 5 years of age (Sargent, Attar-Abate, Meyers, Moore, & Kocher-Ahern, 1992). Eligibility is restricted to families with incomes below 185% of the federal poverty threshold, or an income of \$13,400 for a family of four. WIC agencies provide services and assign priority based on this criterion, in addition to eligible participant's assessed nutritional and health risks (Metallinos-Katsaras, Must, & Gorman, 2010; Sargent et al., 1992).

A recent study investigated the association between women and children's duration of WIC participation and household food security status (Metallinos-Katsaras et al., 2010). A 58.6% non-white low-income sample of 28,353 children participating in the Massachusetts Special Supplemental Nutrition program for WIC was utilized. Multivariate logistic regression analyses were used to examine the association between household food-security status during infant and child visits, and risk of preschool obesity, while controlling for covariates such as race/ethnicity, sex, education, etc. Findings demonstrated that earlier and longer WIC participation was associated with improved food security status, especially for more vulnerable groups, such as people of color and/or lower SES (Metallinos-Katsaras et al., 2011).

Much research has also utilized WIC populations to examine the relationship between low-income, psychosocial outcomes and health. For example, Wightkin, Magnus, Farley, Boris, & Kotelchuck (2007) studied psychosocial predictors of underweight low-income infants of families who participated in WIC. A similar study examined factors that impact

low-income women and infant's feeding decisions using a WIC population (Mickens, Modeste, Montgomery, & Taylor, 2009). A different study that examined psychiatric disorders and treatment in low-income women also identified WIC participants to represent this population (Cook et al., 2010). Given that WIC participants are in fact selected from a more disadvantaged population, research examining issues associated with socioeconomic status often draw from this sample.

#### WIC and Other Social Service Supports and Health

Research has demonstrated that economic fragility in families can stem from a variety of issues, including both mothers' and fathers' low earnings, which often result from lower levels of education, as well as from physical, emotional, and mental health problems (Kalil & Ryan, 2010). The development of various public programs, such as WIC, Welfare and Public Assistance (TAFDC), Supplemental Social Security Income (SSI), public, subsidized, or Section 8 housing, Head Start, and Food Stamps (SNAP), have helped to lessen economic hardship in fragile families. Research has provided support for these programs, indicating that it is essential to strengthen policies that support families' economic self-sufficiency and alleviate hardship during times of economic distress (Kalil & Ryan, 2010). While most research supports the use of public services, findings in this area are conflicted. For example, one study examined a sample of welfare recipients and non-welfare recipients to assess the validity of the claim that welfare can have psychological consequences for single mothers (Pettersen & Friel, 2001). The analysis utilized data from the National Longitudinal Survey of Youth and the National Survey of Families and Households. Findings indicated that welfare recipients reported similar levels of depression and hopelessness as jobless non-welfare recipients (Pettersen & Friel, 2001). Given that research examining social service

needs is conflicted; further research in this area is needed. In addition, it is unclear how much impact these services have directly on mental health.

#### The Online Advocate (TOA)

Given the importance of social service supports in aiding individuals of lower SES, more recent research has examined various methods in providing better access to service. One such example is *The Online Advocate*, a web-based screening and referral tool designed by researchers at Boston Children's Hospital in Boston, MA. This tool was utilized to obtain data for the current study. *The Online Advocate* screens families for health-related social problems, provide tailored feedback about the findings, and help participants select and receive appropriate social service agency referrals based on the participant's expressed needs, eligibility, and geographic location. The social domains included within the tool to screen participants were selected using a combination of key informant interviews, literature review, and surveys of health and social service experts.

*The Online Advocate* utilizes a portable and flexible system that draws upon theories of communication technologies and health behavior change. The program employs the capabilities and advantages of communication technologies, including interactivity (tailoring the questionnaire to the responses of the subject and providing instant feedback), appeal (allowing the participant to choose which referrals they want), and engagement (use of a computer system that families find interesting and fun to use). The program also provides a heightened sense of security which provides an opportunity for the participant to feel safe and therefore more responsive to sensitive questions.

*The Online Advocate* has been in use for several years, and is currently utilized with families in the Children's Hospital Primary Care Center as a *quality improvement*

intervention. Several key studies have implemented *The Online Advocate*, which demonstrates its feasibility and impact. One such study examined families with young children at Martha Elliot Health Center (MEHC) and Children's Hospital Primary Care Center (CHPCC) at Children's Hospital Boston. In this study, *The Online Advocate* included the screening questionnaire without the referral system. The survey instrument focused on five health-related social domains including: access to health care, housing, food security, income security, and domestic violence. The survey instrument included previously validated questions and scales to assess these social domains, as well as new questions that assessed participants experience with social problem screening and referral.

Participants recruited for this study were low-income care givers who were disproportionately Hispanic and African American. Among the 260 eligible caregivers, 79% agreed to participate. One hundred and ninety four (94%) of the participants completed the entire survey. Findings demonstrated that the percentage of families with one or more health-related social problems was high in both clinics, with 76% at CHPCC and 86% at MEHC. The overall rate of health-related need was 82%, and 54% of the families experienced two or more health-related social problems. To evaluate the acceptability of using a computer-based assessment and referral system, participants were asked specifically about the acceptability of using a computer system to screen and refer families for health-related social problems at the pediatricians' office during a well-child visit. 92% of participants reported they would "welcome it" or "not mind at all."

Since this initial study, the proficiency of *The Online Advocate* has been expanded in order to function as a patient-centered assessment and referral tool. An ongoing study of adolescents at Children's Hospital Boston using the screening tool indicates that adolescents

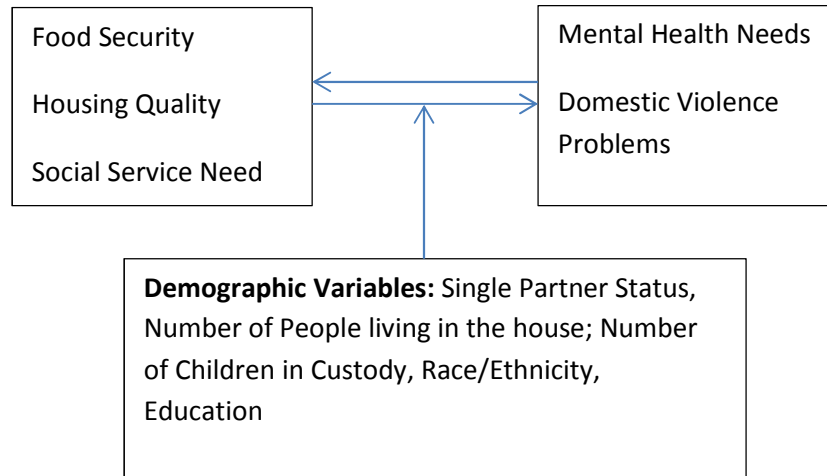
also have extensive social problems, that they will utilize the tool to self-select referrals for these problems, and that when they follow up with social service agencies they can resolve these problems. Among the first 51 participants, ages 15-25 years, 90% had problems in one or more of nine health-related social domains screened, and 64% endorsed problems in two or more domains. Semi-structured interviews were utilized to examine the adolescents' reactions to the use of the screening tool and the printed personalized referral sheets. Qualitative themes noted within the interviews included both positive reactions to the use of a personalized computer-based referral system, and a high comfort in disclosing sensitive information through this method. 96% of participants reported that they would recommend the system to a friend or peer, and 80% reported that the screening tool should be utilized as part of an annual visit.

#### Conceptual Model Depicting the Relationship between SES and Health

The literature outlined demonstrates the importance of multiple variables in determining the relationship between SES and Health. As demonstrated through the direct and indirect pathways of interactions, it is clear that each variable is closely intertwined with another. For example, lower SES can impact housing quality, and housing quality can impact mental and physical health. Similarly, poor mental health can impact SES, which in turn can impact housing quality. The model below helps provide a schema for better understanding how each variable relates to one another.



**Figure 1. Conceptual Model**



Purpose of Current Study and Proposed Research Questions

Given the large body of research examining factors that contribute to mental health in children and families of low socioeconomic status, it is clear that this is an important and timely topic of interest in the field of psychology. However, much of the research to date has examined factors associated with mental health in isolation, such as housing and health, or food security and health, as outlined in the literature above. Additionally, previous research has relied on the use of small community samples, previously diagnosed mental health disorders, and interchanged neighborhood quality for housing quality when examining the predictive nature of housing quality in determining mental health needs or domestic violence problems.

For the purposes of more targeted interventions, a better understanding of which factors play the greatest role in predicting poor mental health/stress is necessary. The current study aims to examine the social profiles of individuals who report having needs associated with domestic violence and mental health and to investigate the extent to which housing problems/quality, food insecurity, and social support needs contribute to/predict problems of

mental health needs and domestic violence. In addition, background variables family status (single/partnered), number of individuals living in the home, number of children in custody, race/ethnicity, and education will be analyzed to determine their impact and contributions to the relationship between housing problems/quality, food insecurity, social support needs and problems of mental health and domestic violence.

The proposed study will build upon previous research by determining how much each factor specifically contributes to greater levels of stress, which will be defined by variables associated with domestic violence problems and mental health need. Results from the proposed study may provide evidence for risk factors in order of importance, as well as the specific details associated with these risk factors, which will promote more targeted interventions and treatment strategies to address stressors. The research questions addressed within the proposed study include: What are the housing and social problems of individuals who attend a health center for low-income, minority families? To what extent are housing and social problems associated with reported experience of domestic violence and mental stress, and are these associations mediated by social support and/or demographic factors? The following hypotheses are proposed:

- 1) Housing problems will significantly predict reports of domestic violence problems of individuals attending a health center for low-income families.
  - 1a) Demographic variables, including: relationship status (single/partnered), number of individuals in the home, number of children in custody, race/ethnicity, and education will significantly mediate the relationship between the predictor variables and reported domestic violence problems.

1b) Food insecurity will significantly mediate the relationship between housing problems and reported domestic violence problems.

1c) Social support needs will significantly mediate the relationship between housing problems, food insecurity, and reported domestic violence problems.

2) Housing problems will significantly predict reports of mental health need of individuals attending a health care center for low-income families.

2a) Relationship status (single/partnered), number of individuals in the home, number of children in the home, race/ethnicity, and education will significantly mediate the relationship between the predictor variables and reported mental health needs.

2b) Food insecurity will significantly mediate the relationship between housing problems and reported mental health needs.

## CHAPTER 2

### METHOD

#### Background Information

This study conducted a secondary analysis of an existing data set. Data were drawn from the initial study, which examined the relationship between health-related social problems and diet quality in families with young children using *The Online Advocate*, an innovative, web-based screening and referral tool utilized for the identification and subsequent management of families' health-related social problems. Specifically, this study utilized secondary data that was collected using *The Online Advocate* to evaluate the association between health-related social problems and diet quality in children in a cross-sectional sample, and to evaluate the relationship between resolution of health-related social problems using *The Online Advocate* and change in diet quality in children over time. The current study only examined the data collected regarding health-related social problems.

#### Participants

##### Characteristics and Criteria of Participants

The current study utilized an existing data set for a group of participants including 308 female parent/guardians recruited over a 12-month period from the Children's Hospital Primary Care Center (CHPCC) at Children's Hospital Boston. Families attending the health center are primarily from low-income and predominantly Hispanic and Black populations. While the majority of these families lived within a ten mile radius of the primary care center

in Boston, several families traveled from more rural areas up to 25 miles away. Recruiters identified families with an age-eligible child being seen for a well-child visit at check-in. Each day, approximately 37 (approximately 1124 per month) families came to the primary care center for well child check-ups. Of those individuals, approximately 10-15 were eligible to participate each day. Throughout the recruitment process, 429 individuals were approached to participate in the study. Of those individuals, 308 families agreed to participate, while 121 families declined. Eligible families were recruited sequentially at check-in when a study computer became available. Interested families met with the recruiter to assess eligibility based on the criteria summarized in Table 1 below.

The study chose age 3 years as a lower limit for inclusion as a result of the difficulties in assessing the eating habits in infant and toddlers, and age 10 as the upper limit in an attempt to exclude children whose guardian(s) may no longer have control of the children's food sources and eating behaviors. Children with active chronic medical conditions and/or chronic use of prescription medication that could impact dietary quality were excluded (see Table 1 below). The study defined chronic as any medication being taken for more than two weeks duration. A standard list of chronic medical conditions and chronic prescription medications that could affect appetite and therefore impact dietary needs was compiled and consistently applied. The most notable medications included oral steroids, stimulants, and other medications utilized to treat various psychiatric conditions, such as Attention Deficit Hyperactivity Disorder (ADHD). Medical conditions for which participants were excluded from the study included conditions such as: cancer, diabetes, congenital heart disease, chronic lung disease or conditions requiring chronic oral steroid use including asthma, atopic eczema, or rheumatologic conditions.

In addition to the inclusion and exclusion criteria noted above, a family was excluded if they had previously used *The Online Advocate* referral tool, had previously participated in or had a first degree relative who had participated in the study, or lived in a household with a more distant relative or non-relative who had participated in the study. Interested and eligible care givers proceeded to the informed consent process. The consent form was presented and signed on the study computer, and the recruiter was present and available to review the consent form and answer any questions. The study coordinator was also available by in-hospital page for any additional questions. Paper copies of the consent form were provided to all participating parent/guardians.

**Table 1. Eligibility Criteria**

<b>Inclusion Criteria:</b>	<b>Exclusion Criteria:</b>
Child between age 3-10 years old	Child with major, active chronic medical illness/condition (such as cancer)
Child lives with parent/guardian at least 5 days per week	Use of prescription medication (such as oral steroids) that may influence diet quality
Parent/guardian must be able to speak and read in English	Prior study participation

#### Apparatus/Instruments/Measures/Variables

##### The Online Advocate Tool

As previously described, *The Online Advocate* is a self-administered questionnaire that is composed of a response-driven, branched questionnaire that ranges from 60-80 questions in English written at a fifth to sixth grade reading level. The branched questionnaire asks questions that are personalized with each participant and their child's name, and presented with only one question per screen to increase ease of use. The multilevel logic system that generates the questionnaire allows the program to draw upon multiple

previous answers in order to determine the next question asked. This type of system provides an opportunity to perform on- the-fly evaluations that minimize the number of questions required for screening. The survey includes of a combination of yes/no, multiple choice, fill in the blank, Likert scale, and “check all that apply” questions. *The Online Advocate* screening took approximately 20-30 minutes to complete. Throughout the survey, participants could skip questions they were not comfortable answering, and confidentiality was continually emphasized.

Within the study, participants were screened for problems within the seven social domains, including: Access to health care, food security, injury prevention, substance abuse, income security, housing, and violence and mental health. These domains reflect problems that often have a significant impact on the health of a family. *The Online Advocate* also screens for ongoing social problems, including environmental stressors, lack of resources, lack of education, and physical and psychological abuse. Additionally, the screening tool assessed services currently utilized (such as food stamps or public financial assistance), and eligibility for services. To determine participant needs and eligibility, the system performs calculations such as food and housing insecurity scores, and income as percentage of the federal poverty line. The screening tool guides the participant in selecting the problems for which they would like to receive assistance, and then allows them to select agencies for which they are interested in receiving a referral.

*The Online Advocate* uses a geographic information system to identify family locations and relevant services within a reasonable radius of that location. After selecting referral agencies, the program provides maps and information about each agency, such as the type of services provided, hours, eligibility, and availability of public transportation. Once

the referrals are selected, a comprehensive printed evaluation and referral sheet is provided to the participant. Given the nature of the current study, the agency referral results were not used for evaluation.

The questions utilized within the survey tool were selected from various national studies and surveys including National Health Interview Survey, Behavioral Risk Factor Surveillance System, Guidelines for Adolescents Preventative Services (GAPS), Growing up Today Study (GUTS), Child Care Experience and Needs Questions, Philadelphia Survey of Work and Family, American Housing Survey, and USAID Food Security. The referral database at the end of the survey includes more than 700 health and human service agencies across Greater Boston.

#### Variable Measures

The criterion variable of domestic violence was measured as a positive response to any of the following items in which participants could report having problems: threat to safety, verbal or emotional abuse, physical abuse, and safety in current relationship. Responses to these individual items were utilized to create a dichotomous variable that yields a score ranging from 0 or 1 for each participant, indicating the presence or non-presence of domestic violence problems. The criterion variable of mental health need was measured on the basis of a positive response to either of the following items in which participants could express need: suicide prevention and counseling/therapy. Responses to these individual items were utilized to create a dichotomous variable that yields a score of 0 or 1 for each participant. The presence of housing problems, one of the focal predictor variables, included a positive response to any of the following items: difficulty with rent and/or possible eviction, no running water, water leaks inside and/or outside the home, insect and/or rodent



infestation, trouble with electrical wiring, utility problems, and no heat for more than 24 hours. Responses to these individual items were utilized to create a dichotomous variable that yields a score ranging from 0 or 1 for each participant, indicating the presence or non-presence of housing problems. Food insecurity, the second focal predictor variable, was measured based on a positive response to any of the following items: Worry about or actual running out of food, eating meals that include only a few kinds of cheap food, and not eating balanced meals. Responses to these individual items were utilized to create a dichotomous variable that yields a score ranging from 0 or 1 for each participant, indicating the presence or non-presence of food insecurity. The social service need variable included a positive response to needing any type of social support, including supports such as Women, Infants, and Children (WIC) Food and Nutrition Service, Social Security Income (SSI), Traditional Aid to Families with Dependent Children (TAFDC), Supplemental Nutrition Assistance Program (SNAP), etc. Responses to these individual items will be utilized to create a dichotomous variable that yields a score ranging from 0 or 1 for each participant, indicating the presence or non-presence of social service needs.

Background/demographic variables were coded on the basis of responses to single items within the survey for each participant, including: race/ethnicity dummy coded as yes (1) and no (0) for each ethnicity examined (Hispanic, African-American, Caucasian, and Other), single parent status dummy coded as yes (1) and no (0), education level, number of individuals living in the home, and number of children in partial or full custody of the respondent. These variables were included as co-variates within each logistic regression model examined.

### Design& Analytic Strategy

The study was a prospective, non-randomized, uncontrolled, single-arm trial, where all subjects received The Online Advocate. Clinicaltrials.gov registration was obtained after IRB approval but prior to initiating recruitment. The analyses presented in Chapter 3, the results section, includes descriptive statistics for the study sample, including: minimum and maximum values, means, standard deviations, and percentages where applicable. The statistical program JMP, pronounced "jump," statistical discovery software from Statistical Analysis Software (SAS), was utilized to conduct secondary analyses of the JMP is a statistical program build with scientist and engineers in mind, providing visual, interactive, comprehensive and extensible results. Descriptive statistics are also provided for all background variables included within the study. Following descriptive statistics, multiple logistic regression analyses were utilized to examine the causal order of associations by modeling changes in domestic violence problems and mental health needs, based on the contributing variables and co-variates noted in the hypotheses. Additionally, odds ratios are presented to support results of the multiple logistic regressions.

The specific multivariate analytic strategy will be executed in three steps. In the initial analysis, model 1 tests the extent to which housing problems and background variables predict domestic violence problems. Model 2 tests the extent to which housing problems, food insecurity, and background variables, predict domestic violence problems. Model 3 tests the extent to which housing problems, food insecurity, background variables, and social service needs predict domestic violence problems. The first two models were run a second time to determine the extent to which these variables predict mental health need. The third

model was excluded from the analyses due to an overlap between the predictor variable of social service need and the outcome variable of mental health need.

### Multiple Logistic Regression

Multiple logistic regression is a statistical procedure in which data are collected on a set of independent or predictor variables (X) and a dependent or criterion variable (Y).

Logistic regression analyses can be utilized to analyze data from experimental or non-experimental designs. This type of statistical model is typically used in psychology when researchers are interested in predicting an outcome based on a set of variables. The specific steps taken in conducting multiple regression analyses depend on whether the sets of variables are ordered or unordered. In the current study the sets of variables were considered unordered, such that the interest was in looking at multiple relationships (Green & Salkind, 2008). For example, the current study aimed to assess how well experienced stress by participants in the study could be mediated from a number of factors. More specifically, a multiple regression analysis was conducted to predict reported mental health needs and domestic violence problems from a number of factors, including: race/ethnicity, education, single/partnered parents, number of individuals living in the home, number of children in custody, housing problems, food insecurity, and social support needs. In this study, the predictor variables were identified as the factors listed above, while the criterion variables were identified as domestic violence problems and mental health needs.

The assumptions underlying the significance test for regression analyses depends on whether a researcher is utilizing a fixed-effects model or a random-effects model. The fixed-effects model is generally used for experimental studies, while the random effects model is more appropriate for non-experimental studies (Green & Salkind, 2008). The current study

was considered non-experimental; therefore assumptions of significance were determined using a random-effects model. The first assumption under this model was that the variables were multivariately normally distributed in the population. If this assumption is met, then the only type of relationship that can exist between the variables is linear. The second assumption was that the cases represented a random sample from the population, and the scores on variables were independent of other scores on the same variables (Green & Salkind, 2008).

In a linear regression model, the coefficient of  $R^2$  is utilized, which summarizes the proportion of variance in the dependent variable associated with the predictor/independent variable(s). In this case, larger  $R^2$  values indicate that more of the variation is explained by the model, with a maximum value of one. However, for regression models that utilize categorical dependent variables, such as in the current study, it is not possible to compute a single  $R^2$  statistic that has all of the characteristics of  $R^2$  in the linear regression model. As a result, pseudo  $R^2$  is calculated as an approximation of  $R^2$  instead ("IBM SPSS Statistics," n.d.).

### Odds Ratios

Odds ratios are important in the interpretation of logistic regression. To understand odd ratios, it is necessary to define the term "odds." The "odds" of an event occurring are defined as the probability of an event occurring divided by the probability of that event not occurring (Field, 2009). The odds ratio is an indicator of the change in odds resulting from a unit change in the predictor, i.e. the proportionate change. This is calculated by dividing the odds after a unit change in the predictor by the odds before that change. The odds ratio is best interpreted in terms of the change in odds, such that if the resulting value is greater than 1,

then it indicates that as the predictor increases, the odds of the outcome occurring increase. In contrast, a value less than one indicate that as the predictor increases, the odds of the outcome occurring decrease (Field, 2009). In this study, the odds ratio provides a statistical value to define how the predictor variables relate to the outcome variables of domestic violence problems and mental health needs in the current study.

## Procedures

### Collection of Study Data

In the current study, subjects were approached in the waiting area of the Primary Care Center upon arrival for their well-child check-up. A recruiter introduced themselves to the subject and briefly described the nature of the study. If a subject agreed to participate, they were led to a small table on which a laptop computer with a security screen and an optional mouse were placed. The children of the parent completing the survey were provided with coloring book and crayons in order to reduce distractions while completing the survey. The recruiter set up the computer program and reviewed the consent procedure with the subject before introducing the survey. For individuals who declined to complete the survey, data regarding age, gender, race, and reason for refusal were recorded in an ongoing database.

During the consent process for person's who agreed to participate; a recruiter explained that the information provided by the family would be used to assist them with social service problems. The eligible parent/guardian was informed that their survey responses would not be included within their child's medical record. The eligible parent/guardian was also informed through the consent process that if their responses indicated active homelessness status, an inability to feed themselves or their family, or that

they were victims of partner abuse, the child's healthcare provider and the CHPCC on-call social worker would be notified.

Participation began at a table in the waiting room, until families were called in to a room for their well child check-up. At this time, the recruiter stopped the survey and remained in the waiting room until the doctor stepped out of the room. The recruiter entered the check-up room for the participant to continue working on the survey until the doctor returned. As a result, the survey was completed in sections, which may have disrupted participant's understanding of the survey, as well as their train of thought.

Layered into *The Online Advocate* screening tool for the study was an adaptation of the Harvard Service Food Frequency Questionnaire (HSFFQ) module designed to assess children's diet quality, however, this data was not utilized for the current project. Once the subject completed the baseline questionnaire (which included the food frequency questionnaire and the social service needs survey), a patient-centered process guided them in selecting the problems for which they would like to receive assistance, as well as the agencies for which they were interested in receiving a referral. Referral suggestions were then provided based on the problems identified by the participant throughout the screening questionnaire. Once an agency or multiple agencies were selected, an agency referral form was printed that included details about each agency as previously described. Upon completion of the survey, participants were provided with a green folder which included the following items: A hard copy of the informed consent, information about an optional follow up opportunity, a sheet of healthy eating coupons, and a \$10 gift card.

## CHAPTER 3

### RESULTS

#### Demographic Description of the Study Sample

This study utilized data from an investigation of health-related problems of families and children attending the Boston Children's Hospital Primary Care Center. The participants in the investigation were mothers or female legal guardians ( $n = 308$ ) of children scheduled for a well-child checkup at a primary care clinic in a large urban area in New England. As seen in Table 2 these women who, on average, were nearly thirty-four years of age (mean = 33.88,  $sd = 7.46$ , range = 19-65) are disproportionately Hispanic (33%) and African-American (47%) although there are smaller complements of Caucasian (6%) and 'Other' racial groups (13%). Most of these women were poor with more than 60% of the sample reporting incomes which placed them more than 100% below the federal poverty level. In general, these women had an education level of some college or vocation school (40%). As also seen in Table 2, most of these women are single parents (58%) currently living in households which include, on average, more than three other people (mean = 3.45,  $sd = 1.52$ ). Of these "other" people, on average, approximately two of them were children that are in the full or partial custody of these mothers (mean = 2.16,  $sd = 1.18$ ).

Descriptive statistics of the population are generally consistent with previous research, especially with regard to the disproportionate presence of minority race/ethnicities. Additionally, findings support previous research with regard to average age, socioeconomic

and single parent status. However, the current study reflects a higher proportion of individuals (40%) who have completed college than much research to date. For example, Suglia, Duarte, and Sandel (2011) examined a population with only 33% endorsing an education level of some college. Similarly, Burdette, Hill, and Hale (2011) had results with a mean education level of high school.

When interpreting results with regards to higher levels of education in the current study, it is important to consider the impact of the economic recession in Boston, MA. For example, as business and consumer spending declined over the past few years, the number of available or unfilled jobs steadily dropped. In 2007, the volume of job postings in Massachusetts began to drop, and then rapidly declined in 2008. From 2007 to 2009, Massachusetts job vacancies dropped from 92,021 to 49,213. The large drop in job vacancies combined with the significant rise in unemployment has made it increasingly difficult for workers to find jobs (Patrick, Murray, Bump, & Taylor, 2009). This change in the economy is important to consider, as it is possible that individuals pursued higher levels of education as a result of the limited availability of jobs. The economic recession may also explain the large percentage of individuals within the study who fall below the federal poverty line.

The purpose of the center investigation was to assemble a detailed, quantitative assessment of the physical and social needs of these women. As seen in Table 3, most of these women had experienced one or more housing problems (60%) and some level of food insecurity (59%). A smaller number of these women expressed having a mental health need (7%) or an experience associated with domestic violence (11%). Results with regard to domestic violence are somewhat consistent with previous research, particularly when compared to the prevalence of domestic violence in the general population (approximately



between 10% and 15%). In contrast, results with regard to mental health need are considerably lower than the prevalence of mental health concerns in the general population (approximately 30%). The prevalence of mental health need in the current study is somewhat surprising given the description of the population. Based on the literature reviewed, one would expect individuals of color with an income level below the federal poverty line to endorse a greater number of mental health concerns.

Given findings from the current study, it is important to note that the current study assessed the presence or absence of mental health needs (i.e. services), as opposed to the presence or absence of mental health problems (i.e. symptoms and/or diagnoses. For example, Suglia et al. (2011) found that approximately 26% of their population endorsed some type of mental health concern, including depression and generalized anxiety. The current study found that only 7% of the population endorsed having a mental health need, but this number may not reflect the presence of mental health concerns. In other words, individuals who completed the survey may already be receiving services for their mental health needs. Additionally, education level may have influenced findings, such that individuals with higher education may be better equipped or have a greater knowledge of how to access support and resources for their mental health concerns.

Data was scanned prior to conducting analyses in order to assess normality and the presence of possible outliers. No outliers were identified within the data set. Based on the examination of bar graphs, distributions of the data tended to be skewed in both positive and negative directions.

**Table 2. Demographic Description of the Study Sample**

<b>Study Sample</b>	<b>%</b>	<b>n = 308</b>
<b>Race</b>		
Hispanic	33	103
African-American	47	144
Caucasian	7	20
Other	13	41
<b>Income</b>	<b>%</b>	<b>n = 260</b>
<100% Below FPL	39	101
100 to 150% FPL	14	37
150 to 200% FPL	18	47
200 to 250% FPL	8	21
>250% Below FPL	21	54
<b>Single Parent Status</b>	58	179
<b>Education Level</b>	<b>%</b>	<b>n = 305</b>
Post Graduate	8	26
College Graduate	28	86
Some College/Vocational School	40	122
High School Graduate/GED	19	57
Less than 12 <sup>th</sup> Grade	5	14

**Table 3. Model Variables/Social Needs Description of the Study Sample**

<b>Categorical Variables</b>	<b>%</b>	<b>n = 308</b>
<b>Any Housing Problem</b>	60	186
<b>Any Food Insecurity</b>	59	182
Marginal Food Security	20	62
Low Food Security	24	75
Very Low Food Security	15	45
<b>Any Domestic Violence</b>	11	33
<b>Any Mental Health Need</b>	7	21

### Multiple Logistic Regression Models

Dependent Variable: Presence or Absence of Domestic Violence – Model 1

*Hypothesis 1 and 1a:* Housing problems will significantly predict reports of domestic violence problems of individuals attending a health center for low-income families; demographic variables will also significantly mediate this relationship.

The logistic regression model estimated the extent to which the dependent variable, the presence or absence of domestic violence, was predicted by race, single parent status, highest level of education attained, number of persons in the household, number of children in custody, the existence of a housing problem. A likelihood ratio test indicated that the six predictors, taken as set, did not significantly mediate a report of domestic violence (pseudo  $R^2 = .06$ ,  $\chi^2 = 11.59$  (8)  $p = .17$ ).

Table 4 provides a more detailed exploration of the analyses presenting the odds ratios and their associated statistical significance tests for the individual predictors in this model. Likelihood ratio tests indicated the significance levels of variables reported in Table 4 (and all subsequent tables). As displayed in Table 4, and consistent with the overall model test, none of the six conceptual predictors were significantly related to a report of domestic violence at the conventionally used  $p < .05$  level. However, one variable, report of a housing problem, approached significance as a mediator. In substantive terms, this “marginally” significant effect indicates that respondents who report a housing problem are more likely to report a domestic violence incident. Specifically, the odds of a domestic violence report are more than twice as likely, i.e.,  $or = 2.20$ ,  $p = .06$ , for those individuals who report a housing problem.

**Table 4. Predicting Domestic Violence: Model 1**

<b>Predictor:</b>	<b>Odds Ratio (CI)</b>	<b>df</b>	<b>p</b>
<b>Race</b>	--	3	.14
Hispanic v. White	1.69 (0.27-32.75)	1	.62
Black v. White	2.12 (0.86-109.66)	1	.45
Other v. White	5.54 (0.38-39.86)	1	.07
<b>Single Parent Status</b>	1.98 (0.86-4.94)	1	.11
<b>Education Level</b>	0.94 (0.62-1.43)	1	.78
<b># Persons in Household</b>	1.01 (0.75-1.35)	1	.92
<b># Children in Custody</b>	1.01 (0.69-1.45)	1	.96
<b>Any Housing Problem</b>	2.20 (0.96-5.56)	1	.06

\*CI = Confidence Intervals

Dependent Variable: Presence or Absence of Domestic Violence – Model 2

*Hypothesis 1a and 1b:* Food insecurity will significantly mediate the relationship between housing problems and reported domestic violence. Demographic variables will also significantly mediate this relationship.

The second logistic regression model using domestic violence as the dependent variable extends the first logistic regression model reported above by including one additional predictor, i.e., a report of one or more types of “food insecurity”, to the preexisting model estimated above. Again, a likelihood ratio test indicated that the seven predictors, taken as set, did not significantly predict a report of domestic violence (pseudo  $R^2 = .07$ ,  $\chi^2 = 14.33$  (9)  $p = .11$ ).

Table 5 presents the odds ratios and their associated statistical significance tests for the individual predictor variables in this model. Likelihood ratio tests were used to generate the significance tests reported in Table 5. As seen in Table 5, and consistent with the overall model test, none of the seven conceptual predictors were significantly related to a report of domestic violence at the conventionally used  $p < .05$  level.

**Table 5. Predicting Domestic Violence: Model 2**

<b>Predictor:</b>	<b>Odds Ratio (CI)</b>	<b>df</b>	<b>p</b>
<b>Race</b>	--	3	.15
Hispanic v. White	1.52 (0.24-29.63)	1	.69
Black v. White	2.07 (0.80-103.48)	1	.46
Other v. White	5.21 (0.37-39.10)	1	.09
<b>Single Parent Status</b>	1.86 (0.80-4.62)	1	.15
<b>Education Level</b>	0.95 (0.62-1.46)	1	.82
<b># Persons in Household</b>	1.02 (0.77-1.35)	1	.87
<b># Children in Custody</b>	0.99 (0.68-1.41)	1	.95
<b>Any Housing Problem</b>	2.00 (0.86-5.09)	1	.11
<b>Any Food Insecurity</b>	1.92 (0.89-4.21)	1	.10

\*CI = Confidence Intervals

Dependent Variable: Presence or Absence of Domestic Violence – Model 3

*Hypothesis 1a and 1c:* Social service needs will significantly mediate the relationship between housing problems, food insecurity, and reported domestic violence. Demographic variables will also significantly mediate this relationship.

The third and last, logistic regression model using domestic violence as the dependent variable extends the second logistic regression model reported above by including another predictor, a count of the number of social service needs reported by the respondents. Unlike the previous two models, a likelihood ratio test indicated that this set of variables was significantly predicted by the dependent variable of reported of domestic violence (pseudo  $R^2 = .10$ ,  $\chi^2 = 19.99$  (10)  $p < .05$ ).

Table 6 presents the odds ratios and their associated statistical significance tests for the individual predictors in this model. As seen in Table 6, and consistent with the overall model test, one of the eight predictor variables was significantly related to a report of domestic violence at the conventionally used  $p < .05$  level. Results demonstrated that the

count of the number of social service needs expressed was statistically significant at  $p = .02$ .

This effect indicates that each additional social service need acknowledged multiplies the odds of reporting domestic violence by a factor of 1.21. Stated in a different way, the odds of reported domestic violence are increased by 21% for each additional social service need reported by these respondents.

**Table 6. Predicting Domestic Violence: Model 3**

<b>Predictor:</b>	<b>Odds Ratio (CI)</b>	<b>df</b>	<b>p</b>
<b>Race</b>	--	3	.16
Hispanic v. White	1.21 (0.19-23.81)	1	.86
Black v. White	1.73 (0.66-88.14)	1	.59
Other v. White	4.41 (0.30-32.92)	1	.14
<b>Single Parent Status</b>	1.66 (0.71-4.13)	1	.25
<b>Education Level</b>	0.80 (0.61-1.48)	1	.81
<b># Persons in Household</b>	0.93(0.73-1.32)	1	.95
<b># Children in Custody</b>	0.90 (0.67-1.41)	1	.92
<b>Any Housing Problem</b>	1.48 (0.60-3.92)	1	.40
<b>Any Food Insecurity</b>	1.51 (0.67-3.41)	1	.32
<b>Social Service Need</b>	1.21 (1.03-1.41)	1	.02*
<b>Count</b>			

\*CI = Confidence Intervals

Dependent Variable: Presence or Absence of a Mental Health Need – Model 1

*Hypothesis 2 and 2a:* Housing problems will significantly predict reports of mental health needs of individuals attending a health care center for low-income families. Demographic variables will also significantly mediate this relationship.

A second series of logistic regression models were estimated in which the dependent variable, the presence or absence of a mental health need, as operationalized by responding ‘yes’ to any one of several possible mental health needs, was examined. As was the case for the first domestic violence model, this outcome was predicted by race, single parent status, highest level of education attained, number of persons in the household, number of children in custody, and the existence of a housing problem. A likelihood ratio test indicated that the

six predictors, taken as set, did not significantly predict the report of a mental health need (pseudo  $R^2 = .04$ ,  $\chi^2 = 6.10$  (8)  $p = .64$ ).

In a more detailed exploration of the data, Table 7 presents the odds ratios and their associated statistical significance tests for the individual predictors in this model. As seen in Table 7, and consistent with the overall model test, none of the six predictor variables were significantly related to a report of one or more mental health needs at the conventionally used  $p < .05$  level.

**Table 7. Predicting a Mental Health Need: Model 1**

<b>Predictor:</b>	<b>Odds Ratio (CI)</b>	<b>df</b>	<b>p</b>
<b>Race</b>	--	3	.94
Hispanic v. White	1.27 (0.19-25.02)	1	.83
Black v. White	1.31 (0.21-41.39)	1	.80
Other v. White	1.90 (0.22-25.20)	1	.58
<b>Single Parent Status</b>	1.43 (0.54-4.00)	1	.47
<b>Education Level</b>	0.72 (0.44-1.18)	1	.20
<b># Persons in Household</b>	1.14 (0.82-1.57)	1	.43
<b># Children in Custody</b>	1.26 (0.82-1.88)	1	.28
<b>Any Housing Problem</b>	1.25 (0.49-3.50)	1	.64

\*CI = Confidence Intervals

Dependent Variable: Presence or Absence of a Mental Health Need – Model 2

*Hypothesis 2a and 2b:* Food insecurity will significantly mediate the relationship between housing problems and reported mental health needs. Demographic variables will also significantly mediate this relationship.

The second logistic regression model utilizing the presence or absence of one or more mental health need as the dependent variable extended the first logistic regression model reported above by including one additional predictor, the report of one or more types of “food insecurity,” to the preexisting model estimated above. A likelihood ratio test indicated

that the seven predictor variables, taken as set, did not predict the report of at least one mental health need (pseudo  $R^2 = .04$ ,  $\chi^2 = 6.46$  (9)  $p = .69$ ).

The odds ratios and their associated statistical significance tests for the individual predictors in this model are presented in Table 8. As seen in the table, and consistent with the overall model test, none of the seven variables were significant predictors of a report of domestic violence at the conventional level of  $p < .05$  level.

**Table 8. Predicting a Mental Health Need: Model 2**

<b>Predictor:</b>	<b>Odds Ratio (CI)</b>	<b>df</b>	<b>p</b>
<b>Race</b>	--	3	.94
Hispanic v. White	1.23 (0.19-24.27)	1	.85
Black v. White	1.31 (0.21-41.39)	1	.80
Other v. White	1.90 (0.22-25.33)	1	.59
<b>Single Parent Status</b>	1.38 (0.52-3.87)	1	.52
<b>Education Level</b>	0.73 (0.44-1.19)	1	.21
<b># Persons in Household</b>	1.14 (0.83-1.56)	1	.40
<b># Children in Custody</b>	1.25 (0.82-1.88)	1	.29
<b>Any Housing Problem</b>	1.20 (0.46-3.38)	1	.71
<b>Any Food Insecurity</b>	1.33 (0.52-3.37)	1	.55

\*CI = Confidence Intervals



## **CHAPTER 4**

### **DISCUSSION**

A series of logistic regression models were estimated in which the dependent variables, the presence or absence of domestic violence, and the presence or absence of mental health need, were predicted by different variables and covariate variables, including race, single parent status, highest level of education attained, number of persons in the household, and the number of children in custody. Likelihood ratio tests were utilized to determine whether the various sets of predictors were significantly related to the separate dependent variables. Additionally, odds ratios were calculated for further exploratory analyses of the relationships between the predictor variables and the dependent variables.

The current study sought to extend previous research, much of which examined factors associated with mental health in isolation, such as housing and health, or food security and health, as outlined in the literature review. A better understanding of which factors play the greatest role in predicting poor mental health/stress is necessary for the development of more targeted interventions. Analyses were conducted with the purpose of describing the predictive nature of social service problems and needs, including housing problems, food insecurity and social support needs, in determining the presence or absence of domestic violence problems and mental health needs.

Dependent Variable: Presence or Absence of Domestic Violence – Model 1

*Hypothesis 1 and 1a:* Housing problems will significantly predict reports of domestic violence problems of individuals attending a health center for low-income families; demographic variables will also significantly mediate this relationship.

Results from the logistic regression do not support the hypothesis that housing problems significantly predict reports of domestic violence for individuals attending a health center for low-income families. That is, the six predictors (co-variables plus housing problems), taken as set, did not predict, i.e., are not related to, a report of domestic violence (pseudo  $R^2 = .06$ ,  $\chi^2 = 11.59$  (8)  $p = .17$ ). However, further exploration of the odds ratios indicated that the report of a housing problem has a significance level which approached the .05 level. This “marginally” significant effect indicates that respondents who report a housing problem were more likely to report a domestic violence incident. Specifically, the odds of a domestic violence report were more than twice as likely, i.e., or = 2.20,  $p = .06$ , for those individuals who report a housing problem.

There are several possible explanations why results did not reach significance, including more general limitations, such as uneven sample sizes, methodological limitations, and the use of dichotomized predictor and outcome variables. Additionally, the assessment of domestic violence in the survey included only two screener items, which may have limited participant's responses. As previously discussed, education level may also have played a role; such that individuals with higher levels of education may be better equipped to address their housing needs.

Although findings do not reach significance, the marginally significant effect is consistent with previous research associated with housing problems as they relate to issues of

domestic violence. As previously discussed, housing quality is closely tied to low socioeconomic status and poverty, and partner violence is more prevalent in low-income urban environments (Benson & Fox, 2004; Benson & Fox, 2001; Suglia et al., 2011). As a result, individuals who are victims of partner violence and have suffered from financial strain are likely to have experienced difficulty obtaining and maintaining stable housing. Additionally, limited financial resources often results in fewer housing options, including housing options that are likely to be in a state of internal and external disrepair (Suglia et al., 2011).

Dependent Variable: Presence or Absence of Domestic Violence – Model 2

*Hypothesis 1a and 1b:* Food insecurity will significantly mediate the relationship between housing problems and reported domestic violence. Demographic variables will also significantly mediate this relationship.

Results from the second logistic regression failed to support the hypothesis that food insecurity significantly mediates the relationship between housing problems and reported domestic violence problems. That is to say, the seven predictors (covariates, housing problems, and food insecurity), taken as set, did not predict, a report of domestic violence (pseudo  $R^2 = .07$ ,  $\chi^2 = 14.33$  (9)  $p = .11$ ). Similar to findings associated with the first model, there are several possible explanations why results did not reach significance. These include: uneven sample sizes, methodological limitations, and the use of dichotomized predictor and outcome variables.

As previously discussed, poverty and food insecurity are closely intertwined, and can have an adverse impact on health (Slopen et al., 2010). Additionally, we know that housing quality is associated with low socioeconomic status, which is in turn linked to an increased

risk for partner violence (Benson & Fox, 2004; Benson & Fox, 2001; Suglia et al., 2011).

Given this research, it is likely that poverty is the common factor in the relationship between both housing quality and food insecurity in terms of their relationship with issues of domestic violence. Results from the current study do not support this research; however, as discussed in model 1, the assessment of food security may have been influenced by individual's higher level of education than was found in previous research.

Dependent Variable: Presence or Absence of Domestic Violence – Model 3

*Hypothesis 1a and 1c:* Social service needs will significantly mediate the relationship between housing problems, food insecurity, and reported domestic violence. Demographic variables will also significantly mediate this relationship.

The third and last, logistic regression model does in fact support the hypothesis that social support needs significantly mediate the relationship between housing problems and reported domestic violence. That is, the eight predictors (housing problems plus food insecurity plus social service need plus covariates), taken together, did predict, the report of domestic violence (pseudo  $R^2 = .10$ ,  $\chi^2 = 19.99$  (10)  $p = .03$ ). This effect demonstrates that each additional social service need acknowledged increases the odds of reporting domestic violence by a factor of 1.21. In other words, the odds of a report of domestic violence increase by 21% for each additional social service need reported by these respondents.

As previously discussed, the development of various public programs, such as WIC, Welfare and Public Assistance (TAFDC), Supplemental Social Security Income (SSI), public, subsidized, or Section 8 housing, Head Start, and Food Stamps (SNAP), have helped to lessen economic hardship in fragile families. Research has provided support for these programs, indicating that it is essential to strengthen policies that support families' economic

self-sufficiency and alleviate hardship during times of economic distress (Kalil & Ryan, 2010). This body of research supports the finding that higher levels of social service need are associated with problems of domestic violence, such that service need is associated with economic hardship, and economic hardship is associated with increased reports of domestic violence. Additionally, we know that greater social service need is associated with greater social stress. This finding is important given that social stress variables, including social conflict or domestic violence, economic stress, discrimination, and trauma exposure are associated with greater mental health issues (Dailey and Humphreys, 2010).

When reviewing significant findings of this study, it is important to note possible limitations. One consideration is that there were many possible items related to social service need to respond to throughout the survey in comparison to housing problems and food insecurity. Additionally, respondents may have selected social needs desired, as opposed to needed. In other words, selecting a social service need may not have reflected an actual need, but rather a desired service. Never the less, this significant finding has important implications for future research.

#### Dependent Variable: Presence or Absence of a Mental Health Need – Model 1

*Hypothesis 2 and 2a:* Housing problems will significantly predict reports of mental health needs of individuals attending a health care center for low-income families. Demographic variables will also significantly mediate this relationship.

Results from the logistic regression model did not support the hypothesis that housing problems significantly predict reports of mental health needs of individuals attending a health care center for low-income families. That is, the six predictors (housing problems plus co-variates), taken as set, do not predict a report of a mental health need (pseudo  $R^2 = .04$ ,  $\chi^2 =$

6.10 (8)  $p = .64$ ). Exploratory analyses supported this finding, with none of the six predictor variables significantly predicting a report of one or more mental health needs at the conventional level of  $p < .05$ .

There are several possible explanations why results did not reach significance, including more general limitations, such as uneven sample sizes, methodological limitations, and the use of dichotomized predictor and outcome variables. Additionally, the assessment of mental health need in the survey included only two items, mental health counseling for disabilities and suicide prevention, which may have limited participant's responses. In other words, participants may not have selected items because those included within the survey did not specifically reflect needs that they experienced. This limitation has important implications for future research, such that many needs assessment surveys do not provide comprehensive assessments of mental health. This limitation is also linked to a general limitation of the survey in that the use of secondary analyses may limit results.

It is also important to consider the difference in variables utilized in this study compared to those in previous research. The current study assessed mental health need, while much research to date has assessed the presence of mental health concerns specifically, such as depression and/or anxiety. This difference may explain the lack of significant results in this model. Finally, the higher level of education reflected in the current study may have played a role in the endorsement of fewer mental health needs.

#### Dependent Variable: Presence or Absence of a Mental Health Need – Model 2

*Hypothesis 2a and 2b:* Food insecurity will significantly mediate the relationship between housing problems and reported mental health needs. Demographic variables will also significantly mediate this relationship.

Results from the second logistic regression model using the presence or absence of one or more mental health need as the dependent variable did not support the hypothesis that food insecurity significantly mediates the relationship between housing problems and reported mental health needs. That is, the seven predictors (housing problems plus food insecurity plus co-variates), taken as set, did not predict a report an expression of at least one mental health need (pseudo  $R^2 = .04$ ,  $\chi^2 = 6.46$  (9)  $p = .69$ ). Exploratory analyses supported this finding, with none of the seven predictor variables significantly predicting a report of domestic violence at the conventional level of  $p < .05$ .

The lack of significant support for this hypothesis may be explained by more general limitations, including uneven sample sizes, methodological limitations, and the use of dichotomized predictor and outcome variables. In keeping with model 1, the assessment of mental health need in the survey included only two items, mental health counseling for disabilities and suicide prevention, which may have limited participant's responses. Additionally, the current study assessed mental health need, while much research to date has assessed the presence of mental health concerns specifically, such as depression and/or anxiety. Again, this difference may explain the lack of significant results in this model. Also in keeping with model 1, it is possible that the presence of individuals with a higher level of education may have influenced findings.

Finally, it is also important to note the limitation that model 3 using mental health need as an outcome variable was excluded from the study given its overlap with the predictor variable of social service need; therefore findings from the current study in this area are limited.

### Significance of the Study

Although findings from the current study did not support all hypotheses based on previous research, results do reflect the importance of research in this area. As discussed above, results from the current study demonstrate the significance of poverty and economic hardship and their impact on social service needs and increased risk of domestic violence in families. The consistency of this finding with earlier research indicates that a greater emphasis should be placed on addressing family's social service needs. Specifically, previous research supports with this belief, such that many families are unable to access social services for a variety of reasons, including issues of transportation and cost. One recent study examined parent reported reasons for unmet mental health needs in children (DeRigne, 2010). Findings demonstrated that being uninsured increased the likelihood of parents reporting that services cost too much as the reason for their children having unmet mental health needs (DeRigne, 2010). Since it is likely that being uninsured is associated with economic hardship, and economic hardship is associated with social service need, this finding may have important policy implications.

Another important study examined case management and access to services for homeless women, which emphasized how lower SES impacts their use of services (Heslin, Andersen, & Gelberg, 2003). The study emphasized how many homeless women do have a number of important programs available to them to address health and social service needs, but that they may be deterred from seeking benefits due to complex eligibility criteria and application procedures. Findings from the study demonstrated that having a case manager was associated with greater odds of using food stamps and of finding shelter without difficulty (Heslin, Andersen, & Gelberg, 2003). These results have important implications for



social service needs, such that better and more assertive forms of outreach programs may help individuals to access social services, which may in turn reduce housing problems, food insecurity, and subsequently, issues associated with domestic violence and mental health.

Finally, as previously discussed, research demonstrates the relationship between mental health and social stress, including discrimination, trauma exposure, social conflict, and economic stress. Additionally, social stressors have been linked to depressive symptoms in low-income women (Dailey & Humphreys, 2010). Given findings from the current study and the supporting research, it is clear that social service need is an important variable in predicting negative outcomes. As such, it is important to address social service needs early on in order to prevent social stressors that increase risk for domestic violence and mental health. Findings from the current study support recent interest and growing research in the area of integrated care, which has important implications for the inclusion of case management and mental health consultation within a primary care setting.

### General Limitations

As noted throughout the discussion section, there are several general limitations of the current study. One such limitation is the dichotomizing of predictor and outcome variables. Dichotomizing the variables restricts the variability in measures and limits analyses of correlation and prediction. MacCallum, Zhang, Preacher & Rucker (2001) describe this phenomenon, reporting:

The negative consequences associated with dichotomization include loss of information about individual differences, loss of effect size and power, the occurrence of spurious significant main effects or interactions, risks of overlooking nonlinear effects, and problems in comparing and aggregating findings across studies.(p. 29).

A second limitation is the use of uneven sample sizes across analyses in the study. For example, sample sizes for the variables predicting the outcome variables of domestic

violence tended to be larger than the sample sizes utilized for the outcome variable of mental health need. Additionally, the sample employed within this study was limited to female guardians; therefore, results may not generalize to the larger population. Similarly, restrictions were also placed on the sample, including age range of children and the absence of major chronic health concerns in order to participate. It is also important to note that participants were primarily low-income minority families, which may also limit generalizability to the larger population.

Issues related to methodology are also important to note in terms of study limitations. For example, participants were recruited during a well-child check at the primary care center. Each participant was approached within the waiting room, where they began completing the survey. However, the survey had to be paused when participants were called into patient rooms to see the doctor, therefore participant's train of thought may have been interrupted and impacted survey results. Additionally, the recruiter sat next to the participant throughout the survey, which may have influenced responses. In other words, participants may have been embarrassed or not answered honestly due to the presence of the recruiter throughout the survey.

Another concern is that participants may have completed the survey for the purpose of receiving the incentives (gift card and food coupons), therefore influencing their responses. This limitation is closely linked to problems associated with the use of self-report measures. Such problems have been documented in research on self-report measures, primarily with regards to social desirability and erroneous perceptions that may limit the reliability of self-report measures (Podsakoff & Organ, (1986). Furthermore, Kessler and colleagues (1995) suggest that both the respondent's ability to understand the questions and

his or her motivation can influence the assessment of psychiatric disorders, which may account for participants limited report of mental health needs and issues of domestic violence throughout the survey.

The use of cross-sectional data is another possible limitation. Although there are a number of advantages of cross-sectional studies, including limited need of resources, lack of follow-up procedures, quick use, and low cost, there are also several drawbacks worth noting. The most important concern with this type of study is differentiating cause and effect from simple association. In other words, given that the data collected provides analyses for a specific point in time, it is difficult to determine the direction and order of relationships. For example, do problems with housing and food insecurity predict domestic violence, or do issues of domestic violence predict housing problems and food insecurity? Without longitudinal data, conclusions about the impact of the factors are difficult to draw.

Finally, an important limitation is that the current study utilized secondary analyses of existing data; therefore, hypotheses were generated based on the data available. Because the original study was to examine the relationship between children's diet quality and social service need, questions throughout the survey were not specifically designed to target the assessment of domestic violence and mental health needs. This is an important drawback of using secondary analyses, and may account for the lack of significant findings.

### Future Directions

The issues examined in the current study, have several important implications for future research and policy development. Further research should place a larger emphasis on the impact of social service needs, and consider the implementation of more assertive forms of outreach programs. Helping individuals to more easily access social services may reduce

housing problems, food insecurity, and subsequently, issues associated with domestic violence and mental health. Additionally, it is important to address the social service needs of families earlier than later in order to reduce and/or prevent social stressors that increase risk for domestic violence and mental health. Findings from the current study have implications associated with the growing interest and need for research in the area of integrated care. A priority in this regard is to include needs assessments during routine medical appointments through the use of brief surveys and/or mental health consultation may be beneficial.

Future research should also target the outcome variables of domestic violence and mental health needs more specifically. As noted earlier, survey items to assess these areas were limited, therefore participants may have under-reported these needs. Additionally, other possible predictor variables should be considered in addition to those examined within the current study. It is possible that results did not support the hypotheses based on the variables utilized within the study. For example, variables more closely related to intergenerational poverty may be important. Other possible predictor variables may include age of children within the home, family history of mental health problems, experiences of traumatic events, and geographic location of participants.

Although not the focus of the current study, examination of possible protective factors may also provide further information regarding the relationship between predictor and outcome variables. For example, families with greater perceived social support may have less need to access services. Similarly, families in which caregivers are seeking appropriate services for themselves may positively impact their assessment of family needs. Additionally, individual characteristics or personality traits may act as protective factors,

such as children's social emotional competence, caregiver's positive self-image or self-perceptions and/or higher levels of self-esteem.

Future studies may also consider providing shorter surveys and provide an opportunity for participants to complete the survey from start to finish in one sitting. Providing a space where participants have greater privacy may promote honesty and more accurate responses throughout the survey may also be important. Another methodological change may include the addition of a Spanish version of the survey given the high percentage of Hispanic/Latino's who attend the primary care center in Boston.

Another possible direction for future studies might be further investigation of the effects of the economic recession on individuals living in the Boston area. It would be interesting to determine how the recession has impacted the daily lives of these individuals in greater detail. Additionally, a follow up study examining the social service needs of individuals after the recession may provide a different picture of how the predictor and outcome variables relate to one another.

The findings of this study reinforce the need to promote prevention efforts. Previous research demonstrates that family experiences of social disadvantages are associated with poorer developmental outcomes of young children across measures of physical and mental health. Additionally, these findings show no evidence of strengthening or attenuating developmentally as children get older (Nicholson et al., 2012). As a result, it is essential that we continue to focus our energy on prevention efforts and early intervention in order to reduce risks associated with domestic violence and mental health needs. It is also important to note that previous research and current findings support the belief that basic needs must be met in order to meet higher needs.

## **Appendix 1:**

### **Core Screener Survey Items from the Online Advocate (TOA)**

1. Demographics – Gender
2. Demographics - Race of parent -Black or African-American
3. Demographics - Race of parent - Asian or Pacific Islander
4. Demographics - Race of parent - American Indian or Native Alaskan
5. Demographics - Race of parent - White
6. Demographics - Race of parent - Hispanic or Latino/a
7. Demographics - Race of parent - Other
8. Demographics - comfortable with English?
9. Demographics - Have children?
10. Demographics - Date of birth
11. DV - In relationship?
12. DV - In relationship - Living with partner?
13. DV - Married?
14. Income - Use any of these services - SNAP (Food Stamps) - Supplemental Nutrition Assistance Program
15. Income - Use any of these services - WIC - Special supplemental nutrition program for Women, Infants, and Children
16. Income - Use any of these services-Free or reduced school lunch program
17. Income - Use any of these services - SSI - Supplemental Social Security Income
18. Income - Use any of these services - Transitional Aid to Families with Dependent Children
19. Income - Use any of these services - -Emergency Aid to Elderly, Disabled, and Children
20. Income - Use any of these services - Low Income Home Energy Assistance
21. Income - Use any of these services - Public Housing
22. Income - Use any of these services - Section 8 Housing
23. Income - Use any of these services - Subsidized Housing or housing vouchers
24. Income - Use any of these services- MassHealth Basic or Standard

25. Income - Use any of these services -Headstart
26. Income - Use any of these services - No one in my family receives any of these services
27. Housing - Type of home
28. Housing - On waiting list for public housing
29. Housing - Interested in public housing
30. Housing - Number of persons in house
31. Income - No services and not homeless - Percent FPL
32. Housing - Rent/Doubled - Utilities threatened/shut off rent
33. Housing - Rent - Impending eviction?
34. Housing - Rent - Problems at home in past 12 months specific - Roof leaked
35. Housing - Rent - Problems at home in past 12 months specific - Problems with electrical wiring
36. Housing - Rent - Problems at home in past 12 months specific- No heat for more than 24 hours
37. Housing - Rent - Problems at home in past 12 months specific - Water leaks in the home from inside (pipes, sinks, toilets)
38. Housing - Rent - Problems at home in past 12 months specific - Water leaks in the home from outside (walls, roof)
39. Housing - Rent - Problems at home in past 3mon specific - None of the toilets worked
40. Housing - Rent - Problems at home in past 3mon specific - Any rats or mice in home or building
41. Housing - Rent - Problems at home in past 3mon specific -Any cockroach or insect infestation
42. Housing - Rent - Problems at home in past 3mon specific - No running water in the home
43. Housing - Rent - Problems at home in past 3mon specific - Broken utilities (sink, dishwasher, etc.)
44. Housing - Rent - Problems at home in past 3mon specific - None of the above
45. Housing - Rent - Has Problems - Problems fixed?

46. Housing - summary questions -Lead inspections
47. Housing - summary questions - Finding a shelter
48. Housing - summary questions - Home repair help
49. Housing - summary questions -Rental Assistance
50. Healthcare - Parent - General health
51. Healthcare - Parent - Health insurance?
52. Healthcare - Family - Any time family couldn't get Rx filled past 12 months
53. Health - Asthma?
54. Health - Asthma - Rate asthma control
55. Health - Asthma - Go to ER stay in hospital for asthma?
56. Healthcare - Parent - Unmet dental needs?
57. Health - summary questions - Finding a primary care doctor
58. Health - summary questions -Free medical care
59. Health - summary questions -Help with pediatric healthcare
60. Health - summary questions- Dental care
61. Health - summary questions - Vision services
62. Health - summary questions - Birth control/contraception
63. Health - summary questions - Pregnancy Counseling
64. Health - summary questions - Sexually Transmitted Disease (STD) Testing
65. Health - summary questions -HIV Testing
66. Health - summary questions - None of these
67. Nutrition - Want help? -Help controlling weight
68. Nutrition - Want help? - Education about nutrition and healthy foods
69. Nutrition - Want help? - Access to a gym
70. Injury - Smoke detector?
71. Injury - Carbon Monoxide Detector?
72. Safety - Interest in any of the following? -Getting an infant or child car seat
73. Safety - Interest in any of the following? -Getting a helmet for bicycling, skateboarding, etc.
74. Safety - Interest in any of the following? -Getting window guards for your home
75. Safety - Interest in any of the following? - Getting covers for electrical outlets



76. Food - Section 1 - Worry that run out of food?
77. Food - Section 1 - Food run out?
78. Food - Section 1 - Not eat balanced meal?
79. Food - Section 1 - Meals include only a few kinds of cheap food?
80. Food - summary questions- Finding a food pantry
81. Food - summary questions -Finding a soup kitchen/free meals
82. Food - summary questions - Help getting SNAP benefits (food stamps)
83. Food - summary questions -Help with WIC (Women, Infants, and Children)
84. Income opening
85. Education - Student?
86. Income - Education level
87. Income - summary questions - Help with welfare or public assistance Transitional Aid to Families with Dependent Children, or welfare, gives cash assistance and support to families, Aid to Families with Dependent Children, Emergency Aid to Families with Dependent Children, Temporary Assistance for Needy Families
88. Income - summary questions -Help with employment/job training
89. Income - summary questions -Help with Social Security Insurance, or Social Security Disability Insurance (disability insurance)
90. Income - summary questions -Help with Legal aid
91. Education - summary questions -Literacy classes (learning to read)
92. Education - summary questions -GED Programs
93. Education - summary questions -Help learning English as a Second Language (ESL classes)
94. Education - summary questions-Vocational or job training
95. Education - summary questions-Classes to learn about using computers
96. Education - summary questions -Tutoring services
97. DV - Safety opening
98. DV - Verbal or emotional abuse
99. DV - Physical abuse
- 100.DV - Safe in current relationship
- 101.Violence - summary questions -Domestic violence hotline

- 102. Violence - summary questions -Domestic violence counseling
- 103. Violence - summary questions -Domestic violence shelter
- 104. Violence - summary questions-Anger management
- 105. Substance - Cigarettes per day?
- 106. Mental health - summary questions-Suicide prevention
- 107. Mental health - summary questions-Counseling Services
- 108. Demographics - Immigration status

## REFERENCES

- Aber, J.L. & Chaundry, A. (2010). *Low-income children, their families, and the great recession: what next in policy?* Washington, DC: Urban Institute. Retrieved from [http://www.urban.org/uploadedpdf/412069\\_low-income\\_children.pdf](http://www.urban.org/uploadedpdf/412069_low-income_children.pdf).
- Alaimo, K., Olson, C.M., & Frongillo, E.A. (2002). Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. *J Nutr*, 132, 719-725.
- Ali, J. & Avison, W.R. (1997). Employment transitions and psychological distress: the contrasting experiences of single and married mothers. *J Health Soc Behav*, 38(4), 345-362.
- Aneshensel, C.S., Frerichs, R.R., & Clark, V.A. (1981). Family roles and sex differences in depression. *J Health Soc Behav*, 22, 379-393.
- Bardasi, E. & Francesconi, M. (2004). The impact of atypical employment on individual wellbeing: evidence from a panel of British workers. *Soc Sci Med*, 58, 1671-1688.
- Ben-Shlomo, Y. & Kuh, D. (2002). A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *Int J Epidemiol*, 31(2), 85-293.
- Benson, M. & Fox, G. (2004). *Concentrated Disadvantage, Economic Distress, and Violence against Women in Intimate Relationships*. Washington, DC: National Institute of Justice.
- Benson, M. & Fox, G. (2001). *Economic Distress, Community Context and Intimate Violence: An Application and Extension of Social Disorganization Theory, Final Report*. Washington, DC: National Institute of Justice.
- Birkett, D., Johnson, D., Thompson, J. R., & Oberg, D. (2004). Reaching low-income families: Focus group results provide direction for a behavioral approach to WIC services. *Journal of the American Dietetic Association*, 104(8), 1277-1280.
- Blackman, T. & Harvey, J. (2001). Housing renewal and mental health: a case study. *Journal of Mental Health*, 10, 571-583.
- Bor, W., Najman, J.M, Anderson, M.J., et al. (1997). The relationship between low family income and psychological disturbance in young children: an Australian longitudinal study. *Aust NZJ Psychiatry*, 31, 664-675.
- Bostick, J. (2004). The high price of poverty. Poverty and debt are major risk factors for mental ill health in deprived communities and groups. *Mental Health Today*, 27-29.

- Broffenbrenner, U. (2005). *Making human beings human: bioecological perspectives on human development*. Thousand Oaks, CA: Sage Publications.
- Buckner, J. C., Bassuk, E. L., Weinreb, L. F., & Brooks, M. G. (1999). Homelessness and its relation to the mental health and behavior of low-income school-age children. [Research Support, U.S. Gov't, P.H.S.]. *Developmental psychology*, 35(1), 246-257.
- Burdette, A. M., Hill, T. D., & Hale, L. (2011). Household disrepair and the mental health of low-income urban women. *Journal of urban health: bulletin of the New York Academy of Medicine*, 88(1), 142-153.
- Chisolm, D., Fliher, A.J., Lund, C., Patel, V., Saxena, S., Thornicroft, G. et al. (2007). Scale up services for mental disorders: a call for action. *Lancet*, 370(9594), 1241-1252.
- Chen, E., Matthews, K.A., & Boyce, W.T. (2002). Socioeconomic differences in children's health: how and why do these relationships change with age? *Psychol Bull*, 128, 295-329.
- Cleary, P.S. & Mechanic, D. (1983). Sex differences in psychological distress among married people. *J Health Soc Behav*, 24(2), 111-121.
- Cook, C. A., Flick, L. H., Homan, S. M., Campbell, C., McSweeney, M., & Gallagher, M. E. (2010). Psychiatric disorders and treatment in low-income pregnant women. *Journal of women's health*, 19(7), 1251-1262.
- Dailey, D. E., & Humphreys, J. C. (2011). Social stressors associated with antepartum depressive symptoms in low-income African American women. *Public health nursing*, 28(3), 203-212.
- Dalgard, O.S. (2008). Social inequalities in mental health in Norway: possible explanatory factors. *International Journal of Equity in Health*, 7(27), 1127-1187.
- Das, J., Do, Q.T., Friedman, J., McKenzie, D., & Scott, K. (2007). Mental health and poverty in developing countries: revisiting the relationship. *Social Science and Medicine*, 65(30), 467-480.
- Davey-Rothwell, M.A., German, D., & Latkin, C.A. (2008). Residential transience and depression: does the relationship exist for men and women? *J Urban Health*, 85(5), 707-716.
- DeRigne, L. (2010). What are the parent-reported reasons for unmet mental health needs in children? *Health and Social Work*, 35(1), 7-15.
- Du Bois & William, E.B. (1967). *The Philadelphia Negro: A Social Study*. New York: Schocken Books.

- Dunn, J.R. (2002). Housing and inequalities in health: a study of socioeconomic dimensions of housing and self-reported health from a survey of Vancouver residents. *J Epidemiol Community Health*, 56(9), 671-681.
- Dunn, J.R. & Hayes, M.V. (1999). Identifying social pathways for health inequalities. The role of housing. *Ann NY Acad Sci*, 896, 399-402.
- Elliot, M. (2000). The stress process in neighborhood context. *Health Place*, 6(4), 287-299.
- Evans, G.W. & English, K. (2002). The environment of poverty: multiple stressor exposure, psychophysiological stress, and socioemotional adjustment. *Child Development*, 73, 1238-1248.
- Evans, G.W., Lepore, S.J., & Allen, K.M. (2000). Cross-cultural difference in tolerance for crowding: fact or fiction? *J Pers Soc Psychol*, 79(2), 204-210.
- Evans, G.W., Wells, N.M., Chan, H.Y., & Saltzman, H. (2000). Housing quality and mental health. *J Consult Clin Psychol*, 68(3), 526-530.
- Evans, G.W., Wells, N.M., & Moch, A. (2003). Housing and mental health: a review of the evidence and a methodological and conceptual critique. *Journal of Social Issues*, 59(3), 475-500.
- Federal Poverty Level. n.d. Retrieved May 10, 2013 from About.com US Economy: [http://useconomy.about.com/od/glossary/g/Federal\\_Poverty\\_Level.htm](http://useconomy.about.com/od/glossary/g/Federal_Poverty_Level.htm).
- Field, A. (2009). *Discovering Statistics Using SPSS, Third Edition*. Thousand Oaks, CA: SAGE Publications Inc.
- Flisher, A.J., Lund, C., Funk, M., et al. (2007). Mental health policy development and implementation in four African countries. *J Health Psychol*, 12, 505-516.
- George, L.K. & Lynch, S.M. (2003). Race differences in depressive symptoms: A dynamic perspective on stress exposure and vulnerability. *Journal of Health and Social Behavior*, 44(3), 353-369.
- Gilman, S.E., Kawachi, I., Fitzmaurice, G.M., & Buka, S.L. (2003). Family disruption in childhood and risk of adult depression. *American Journal of Psychiatry*, 160, 939-946.
- Gore, S., Aseltine, R.H., & Colton, M.E. (1992). Social structure, life stress, and depressive symptoms in a high school-aged population. *Journal of Health and Social Behavior*, 33, 97-113.

- Graetz, B. (1993). Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc Sci Med*, 36(6), 715-724.
- Green, S.B. & Salkind, N.J. (2008). *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data, Fifth Edition*. Upper Saddle River, NJ: Pearson Education, Inc.
- Hogan, D.P. & Park, J.M. (2000). Family factors and social support in the developmental outcomes of very low-birth weight children. *Clin Perinatol*, 27(2), 433-459.
- Heslin, K.C., Andersen, R.M., & Gelberg, L. (2003). Original paper: Case management and access to services for homeless women. *Journal of Health Care for the Poor and Underserved*, 14(1), 34-51.
- Hopton, J.L. & Hunt, S.M. (1996). Housing conditions and mental health in a disadvantaged area in Scotland. *J of Epidemiol Community Health*, 50, 56-61.
- House, J. & Kahn, R. (1985). Measures and concepts of social support. In Cohen S, Syme S (eds): *Social Support and Health*. Orlando, Academic Press, 83-105.
- IBM SPSS Statistics. (n.d.). Retrieved April 20, 2013 from IBM: <http://www.ibm.com/us/en/>.
- Intergenerational Poverty in America. (2011). Retrieved May 11, 2013 from Global Research: <http://www.globalresearch.ca/intergenerational-poverty-in-america/22705>.
- Kalil, A., & Ryan, R. M. (2010). Mothers' economic conditions and sources of support in fragile families. *The Future of children / Center for the Future of Children, the David and Lucile Packard Foundation*, 20(2), 39-61.
- Kataoka, S.H., Zhang, L., & Wells, K.B. (2002). Unmet need for mental health care among US children: variation by ethnicity and insurance status. *American Journal of Psychiatry*, 159(9), 1548-1555.
- Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C.B. (1995). Post-traumatic stress disorder in the national comorbidity survey. *Archives of General Psychiatry*, 30, 776-783.
- Kessler, R., Demler, O., Frank, R., Olfson, M., Pincus, H., Walters, E. et al. (2005b). Prevalence and treatment of mental disorders, 1990 to 2003. *New England Journal of Medicine*, 352(24), 2515-2523.
- Kogan, M., Alexander, G., Teitelbaum, M., et al. (1995). The effects of gaps in health insurance on continuity of a regular source of care among preschool-aged children in the United States. *JAMA* 274: 1429-1435, Abstract.

- Koenen, K. C., Moffitt, T. E., Poulton, R., Martin, J., & Caspi, A. (2007). Early childhood factors associated with the development of post-traumatic stress disorder: results from a longitudinal birth cohort. *Psychological medicine*, 37(2), 181-192.
- Kropf, M.L., Holben, D.H., Holcomb, J.P., & Anderson, H. (2007). Food security status and produce intake and behaviors of special supplemental nutrition program for women, infants, and children and farmers' market nutrition program participants. *Journal of the American Dietetic Association*, 107(11), 1903-1908.
- Krieger, N. (1987). "Shades of Difference: Theoretical Underpinnings of the Medical Controversy on Black/White Differences in the United States, 1830-1870." *International Journal of Health Services*, 17, 259-278.
- Kroenke, C. (2008). Socioeconomic status and health: youth development and neomaterialist and psychosocial mechanisms. *Soc Sci Med*, 66(1), 31-42.
- Lahelma, E., Laaksonen, M., Martikainen, P., Rahkonen, O., & Sarlio-Lahteenkorva, S. (2006). *Soc Sci Med*, 63(5), 1383-1399.
- Langevin, D. D., Kwiatkowski, C., McKay, M. G., Maillet, J. O., Touger-Decker, R., Smith, J. K., & Perlman, A. (2007). Evaluation of diet quality and weight status of children from a low socioeconomic urban environment supports "at risk" classification. *Journal of the American Dietetic Association*, 107(11), 1973-1977.
- Lankford, H., Loeb, S., & Wycoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis*, 24(1), 37-62.
- Li, K., Davison, K. K., & Jurkowski, J. M. (2012). Mental health and family functioning as correlates of a sedentary lifestyle among low-income women with young children. *Women & health*, 52(6), 606-619.
- Lund, C., Breen, A., Flisher, A.J., et al. (2010). Poverty and common mental disorders in low and middle income countries: a systematic review. *Soc Sci Med*, 71, 517-528.
- Lund, C., De Silva, M., Plagerson, S., Cooper, S., Chisholm, D., Das, J., & Patel, V. (2011). Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. *Lancet*, 378(9801), 1502-1514.
- MacCallum, R.C., Zhang, S., Preacher, K.J., & Rucker, D.D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7(1), 19-40.
- Magdol, L. (2002). Is moving gendered? The effects of residential mobility on the psychological well-being of men and women. *Sex Roles*, 45, 553-560.
- Marchand, A. et al. (2003). The moderating effect of alcohol intake on the relationship between work strains and psychological distress. *J Stud Alcohol*, 64, 419-427.

- Matthews, S. & Power, C. (2002). Socio-economic gradients in psychological distress: a focus on women, social roles and work-home characteristics. *Soc Sci Med*, 54, 799-810.
- Maslow, A. (1970). *Motivation and Personality*, second edition. New York: Harber and Row.
- Massey, D.S. & Denton, N.A. (1993). *American Apartheid: Segregation and the Making of the Underclass*. Cambridge, MA: Harvard University Press.
- Metallinos-Katsaras, E., Gorman, K. S., Wilde, P., & Kallio, J. (2011). A longitudinal study of WIC participation on household food insecurity. *Maternal and child health journal*, 15(5), 627-633.
- McLoyd, V.C. (1990). The impact of economic hardship on Black families and children: Psychological distress, parenting, and socioemotional development. *Child Development*, 61, 311-346.
- Mickens, A. D., Modeste, N., Montgomery, S., & Taylor, M. (2009). Peer support and breastfeeding intentions among black WIC participants. *Journal of human lactation : official journal of International Lactation Consultant Association*, 25(2), 157-162.
- Munoz, M., Crespo, M., & Perez-Santos, E. (2005). Homeless effects on men's and women's health. *Int J Ment Health*, 34(2), 47-61.
- Murali, V. & Oyebode, F. (2004). Poverty, social inequality and mental health. *Advances in Psychiatric Treatment*, 10, 216-224.
- Murthy, R., Bertolote, J., Epping-Jordan, J.A., Funk, M., Prentice, T., Saraceno, B. et al. (2001). *The World Health Report Mental Health: New Understanding New Hope*. Geneva: World Health Organization.
- Najman, J. M., Hayatbakhsh, M. R., Clavarino, A., Bor, W., O'Callaghan, M. J., & Williams, G.M. (2010). Family poverty over the early life course and recurrent adolescent and young adult anxiety and depression: a longitudinal study. *American journal of public health*, 100(9), 1719-1723.
- Najman, J.M., Hayatbakhsh, M.R., Hero, M.A., Bor, W., O'Callaghan, M.J. & Williams, G.M. (2009). The impact of episodic and chronic poverty on child cognitive development. *J Pediatr*, 154(2), 284-289.
- National Research Council & Institute of Medicine. (2009). *Preventing mental, emotional, and behavioral disorders among young people: progress and possibilities* (M.E. O'Connell, T. Boat, & K.E. Warner, Eds). Washington, DC: National Academies Press.



- Newacheck, P. & Stoddard, J. (1994). Prevalence and impact of multiple childhood chronic illness. *J Pediatr* 124, 40-48, Abstract.
- Ngui, E.M., & Flores, G. (2007). Unmet needs for specialty, dental, mental, and allied health care among children with special health care needs: are there racial/ethnic disparities? *Journal of Health Care for the Poor & Underserved*, 18(4), 931-949.
- Ngui, E. M., Khasakhala, L., Ndeti, D., & Roberts, L. W. (2010). Mental disorders, health inequalities and ethics: A global perspective. [Review]. *International review of psychiatry*, 22(3), 235-244.
- Nicholson, J. M., Lucas, N., Berthelsen, D., & Wake, M. (2012). Socioeconomic inequality profiles in physical and developmental health from 0-7 years: Australian National Study. [Research Support, Non-U.S. Gov't]. *Journal of epidemiology and community health*, 66(1), 81-87.
- Nord, M., Andrews, M., & Carlson, S. (2007). Measuring Food Security in the United States, 2005. Washington, DC: USDA Economic Research Service. Economic Research Report No. 29.
- Nuru-Jeter, A. M., Sarsour, K., Jutte, D. P., & Boyce, W. T. (2010). Socioeconomic predictors of health and development in middle childhood: variations by socioeconomic status measure and race. *Issues in comprehensive pediatric nursing*, 33(2), 59-81.
- Ozer, E. J., Fernald, L. C., Weber, A., Flynn, E. P., & VanderWeele, T. J. (2011). Does alleviating poverty affect mothers' depressive symptoms? A quasi-experimental investigation of Mexico's Oportunidades programme. *International journal of epidemiology*, 40(6), 1565-1576.
- Patel, V. & Kleinman, A. (2003). Poverty and common mental disorders in developing countries. *Bull World Health Organization*, 81, 609-615.
- Patrick, D.L., Murray, T.P., Bump, S.M., & Taylor, M. (2009). *Analysis of the economic impact of the recession on Massachusetts*. Boston, MA: Commonwealth of Massachusetts.
- Pavao, J., Alvarez, J., Baumrind, N., Induni, M., & Kimerling, R. (2007). *Intimate partner violence and housing instability*. *Am J Prev Med*, 32(2), 143-146.
- Petterson, S.M. & Friel, L.V. (2001). Psychological distress, hopelessness and welfare. *Welfare, Work, and Well-Being*, 32(1-2), 79-99.
- Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *Journal of health and social behavior*, 51 Suppl, S28-40.

- Phinney, R., Danziger, S., Pollock, H.A., & Seefeldt, K. (2007). Housing instability among current and former welfare recipients. *Am J Public Health*, 97(5), 832-837.
- Podsakoff, P.M. & Organ, D.W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4), 531-544.
- Poulton, R., Caspi, A., Milne, B.J., et al. (2002). Association between children's experience of socioeconomic disadvantage and adult health: a life-course study. *Lancet*, 360(9346), 1640-1645.
- Proper, K.I., Singh, A.S., van Mechelen, W., & Chinapaw, M.J. (2011). Sedentary behaviors and health outcomes among adults: A systematic review of prospective studies. *Am J Prev Med*, 40(2), 174-182.
- Prus, S.G. (2007). Age, SES, and health: a population level analysis of health inequalities over the life course. *Social Health Illn*, 29, 275-296.
- Reading, R. & Reynolds, S. Debt, (2001). Social disadvantage and maternal depression. *Soc Sci Med*, 53(4): 441-453.
- Saraceno, B., Levav, I., & Kohn, R. (2005). The public mental health significance of research on socio-economic factors in schizophrenia and major depression. *World Psychiatry*, 4, 181-185.
- Sargent, J. D., Attar-Abate, L., Meyers, A., Moore, L., & Kocher-Ahern, E. (1992). Referrals of participants in an urban WIC program to health and welfare services. *Public health reports*, 107(2), 173-178.
- Seguin, L., Xu, Q., Gauvin, L., Zunzunegui, M-V., Potvin, L., & Potvin, L. (2005). Understanding the dimensions of socioeconomic status that influence toddlers' health: unique impact of lack of money for basic needs in Quebec's birth cohort. *J Epidemiol Community Health*, 59(1), 42-48.
- Schulz, A.J., Williams, D.R., Israel, B.A., & Lempert, L.B. (2002). "Racial and Spatial Relations as Fundamental Determinants of Health in Detroit. " *The Milbank Quarterly*, 80, 677.
- Shaw, M. (2002). Housing and public health. *Annu Rev Public Health*, 25, 397-418.
- Slopen, N., Fitzmaurice, G., Williams, D. R., & Gilman, S. E. (2010). Poverty, food insecurity, and the behavior for childhood internalizing and externalizing disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(5), 444-452.

- Spruijt, E.D. & de Goede, M. (1997). Transitions in family structure and adolescent well-being. *Adolescence*, 32, 897-911.
- Suglia, S. F., Duarte, C. S., & Sandel, M. T. (2011). Housing quality, housing instability, and maternal mental health. [Research Support, N.I.H., Extramural]. *Journal of urban health: bulletin of the New York Academy of Medicine*, 88(6), 1105-1116.
- Shonkoff, J. P., & Garner, A. S. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129(1), e232-246.
- Thoits, P. A. (2010). Stress and health: major findings and policy implications. [Review]. *Journal of health and social behavior*, 51 Suppl, S41-53.
- Vanhecke, T.E., Franklin, B.A., Miller, W.M., de Jong, A.T., Coleman, C.J., & McCullough, P.A. (2009). Cardiorespiratory fitness and sedentary lifestyle in the morbidly obese. *Clin Cardiol*, 32(2), 121-124.
- Wagmiller, R.L. & Adelman, R.M. (2009). Childhood and intergenerational poverty: The long-term consequences of growing up poor. *National Center for Children in Poverty*, 1-7.
- Whitaker, R.C., Phillips, S.M., & Orzol, S.M. (2006). Food insecurity and the risks of depression and anxiety in mothers and behavior problems in their preschool-aged children. *Pediatrics*, 118, 859-868.
- Wightkin, J., Magnus, J. H., Farley, T. A., Boris, N. W., & Kotelchuck, M. (2007). Psychosocial predictors of being an underweight infant differ by racial group: a prospective study of Louisiana WIC program participants. *Maternal and child health journal*, 11(1), 49-55.
- Williams, D.R., & Collins, C. (1995). "U.S. Socioeconomic and Racial Differences in Health: Patterns and Explanations." *Annual Review of Sociology*, 21, 349-386.
- Williams, D.R. & Mohammed, S.A. (2008). "Poverty, Migration, and Health." Pp. 135-169 in *The Colors of Poverty*, edited by A.C. Lin and D.R. Harris. New York: Russell Sage Foundation.
- Williams, D.R. & Sternthal, M. (2010). Understanding racial-ethnic disparities in health: sociological contributions. *Journal of Health and Social Behavior*, 51(S), S15-S27.
- Witts, S. & Olston, S. (1996). Prevalence of domestic violence in the United States. *J Am Med Womens Assoc*, 51(3), 77-82.
- Wood, D. (2003). Effect of child and family poverty on child health in the United States. *Pediatrics*, 112, 707-711.

- Wittchen, H.U., Jonsson, B., & Olesen, J. (2005). Towards a better understanding of the size and burden and cost of brain disorders in Europe. *European Neuropsychopharmacology*, 15(4), 355-356.
- Wright, P.A. & Kloos, B. (2007). Housing environment and mental health outcomes: a levels of analysis perspective. *J Environ Psychol*, 27, 79-89.
- Yoshikawa, H., Aber, J. L., & Beardslee, W. R. (2012). The effects of poverty on the mental, emotional, and behavioral health of children and youth: implications for prevention. *The American psychologist*, 67(4), 272-284.
- Zabkiewicz, D. (2010). The mental health benefits of work: do they apply to poor single mothers? [Research Support, N.I.H., Extramural]. *Social psychiatry and psychiatric epidemiology*, 45(1), 77-87.
- Zalenski, R.J. & Raspa, R. (2006). Maslow's hierarchy of needs: A framework for achieving human potential in hospice. *Journal of Palliative Medicine*, 9(5), 1120-1127.